ENAV

Technical Directorate

EnRoute/APP ATC USER REQUIREMENTS DOCUMENT for the Programme "4-Flight: New ATM Product and SESAR improvements"

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1 INTRODUCTION

1.1 GENERALITY

This document provides the Operational Requirements of the ATM partition supporting the Air Traffic control activities for En-Route/Approach flight phase.
Due to the complexity of the Programme, the duration and the necessary international co-ordinations with the French partner as well as within Sesar, the technical documentation (User Requirements Document, High Level Logical Architecture, Statement Of Work) made available to Candidates for the preparation of their Tenders, may be, if necessary, subject to further refinements both in the specification and in the organisation at Lettere d'Ordine Applicative (LOA) issue time.

1.2 GLOSSARY AND TERMINOLOGY

See Ref. [5]

1.3 READING GUIDE

The En Route/APP ATC User Requirement Document (URD) is structured as follows:
Section 1: Document Introduction;
Section 3: Provides the set of En Route /APP ATC User Requirements;
Section 5: Describes both operational and technical Open Issues related to the en-Route ATC environment.

1.4 APPLICABLE DOCUMENTS

The following documents, for what expressly referenced in this document, are to be considered as a part of this URD document itself:

Identification	Document Name	Reference Number	Version
[1] SSS	Coflight SSS	ECPR000V2R1-E01SSS	01.00
[2] HLLA	4-Flight en-RouteApp High Level Logical Architecture		
[3] HLLA TRAIN_SIMU	4-Flight en-RouteApp Training and Simulation High Level Logical Architecture		
[4] GLO	4-Flight Glossary		02.00
[5] HLOR	High Level Operational Requirement, dated 30/01/2009		01.01

2 4-FLIGHT SYSTEM CONTEXT

2.1 4-FLIGHT SYSTEM MISSION AND STATES

The 4-Flight system will support several ATC missions and states. These missions and states are defined as the high level ATC objectives for the 4-Flight system. They are based on the ones already described for Coflight.
The missions are:

  - Civil Air Traffic Control mission (GAT traffic)
  - Military Air Traffic Control mission (OAT traffic)
  - Civil and Military Air Traffic Control mission (the so-called co-localized mission)
- The Civil Air Traffic Control is the main mission that the 4-Flight system shall support. In this mission, the 4-Flight system shall provide services for ACCs, APP and Tower (note: 4-Flight system does not encompass Tower system. However it shall guarantee the interoperability with Towers).
- Through the Military Air Traffic Control mission, the 4-Flight system shall provide services to military Air Traffic Controllers for the control of military flights, as for the civil ATC mission.
- In the Civil and Military Air Traffic Control mission, the 4-Flight system shall provide services to civil and military Air Traffic Controller working in the same centre.
- Note: even if the Civil (respectively Military) mission has the main goal to serve Civil (Military) users, both missions are capable of providing civil/military crossing function.
- The 4-Flight system will support the following five states:
  - Operational state,
  - Training state,
  - Test state,
  - Playback state,
  - Evaluation state.

A state is assigned to hardware & software configuration of the system organized according to consistent system partition. Each partition includes the infrastructure (i.e. Middleware) and either all components (operational state, training state) or a subset (i.e. a test partition can include only the set of components needed for the test - a playback partition can be limited to a CWP). Only one state can be assigned to a system partition at a time, even if it is possible to switch its state by supervision order (e.g. test state to operational state switch).
The Operational state is a system state allowing to meet all the ATS operational objectives.
If not otherwise specified, all user requirements are applicable to the Operational state.
The target 4-Flight system shall support the training of the air traffic controllers (both civil and military if the 4-Flight system shall support the Military Air Traffic Control mission), operational supervisor, technical supervisor and flight data operators.
The Training state is the state normally required by the system to be integrated in the training system environments.
In the training environment, the system is used in the same way as in the operational environment except that time and external systems may be simulated as well as aircraft and pilots.
If not otherwise specified, all user requirements applicable to the Operational state are applicable to the Training state.
The system can be run in a test state in order to perform tests on new operational procedures, new environment or new software configuration version.
Tests can be performed using a set of on-line real traffic data (e.g. plots, flight data synchronization).
The information exchanged between a 4-Flight system in test state (hereafter called Test 4-Flight system), the other systems (simulated or operated in a Test state) and the connected equipment are the same as those exchanged between the 4-Flight system in operational state and these respective external systems.
If not otherwise specified, all user requirements applicable to the Operational state are applicable to the Test state.

Playback state is the state required to achieve visualization of what has been presented on a working position.
Evaluation state is the state normally required by the system to carry out operational evaluation of a new system version or a major environment data modification before getting in operation. In this state, the evaluation system is fed by the operational one but not exactly as a mirror insofar as such data can be locally modified.
If not otherwise specified, all user requirements applicable to the Operational state are applicable to the Evaluation state.
Note : The Coflight System supports 3 states: Operational, Training and Test states. In Evaluation state, the 4-Flight system may include a Coflight instance in test state, fed with live data. In playback state, the 4-Flight system may not need to include a Coflight instance.

2.2 4-FLIGHT SYSTEM DIAGRAM CONTEXT

The scope of a system is defined looking at its environment and its relations with the other systems.
The Step 1 scope might include parts of system which are not necessarily shared, however it shall not prevent the Step 2 common platform development. This section gives the complete picture of the 4-Flight system procurement scope for STEP1 and introduces all the external systems that have interfaces with it.
In STEP1, the 4-Flight system is a scalable ATC System including the software components to support the services of ACC and Approach supporting civil and military air traffic control deployed according to different HW configuration schemes.
The 4-Flight system extends the product developed in the framework of Coflight.

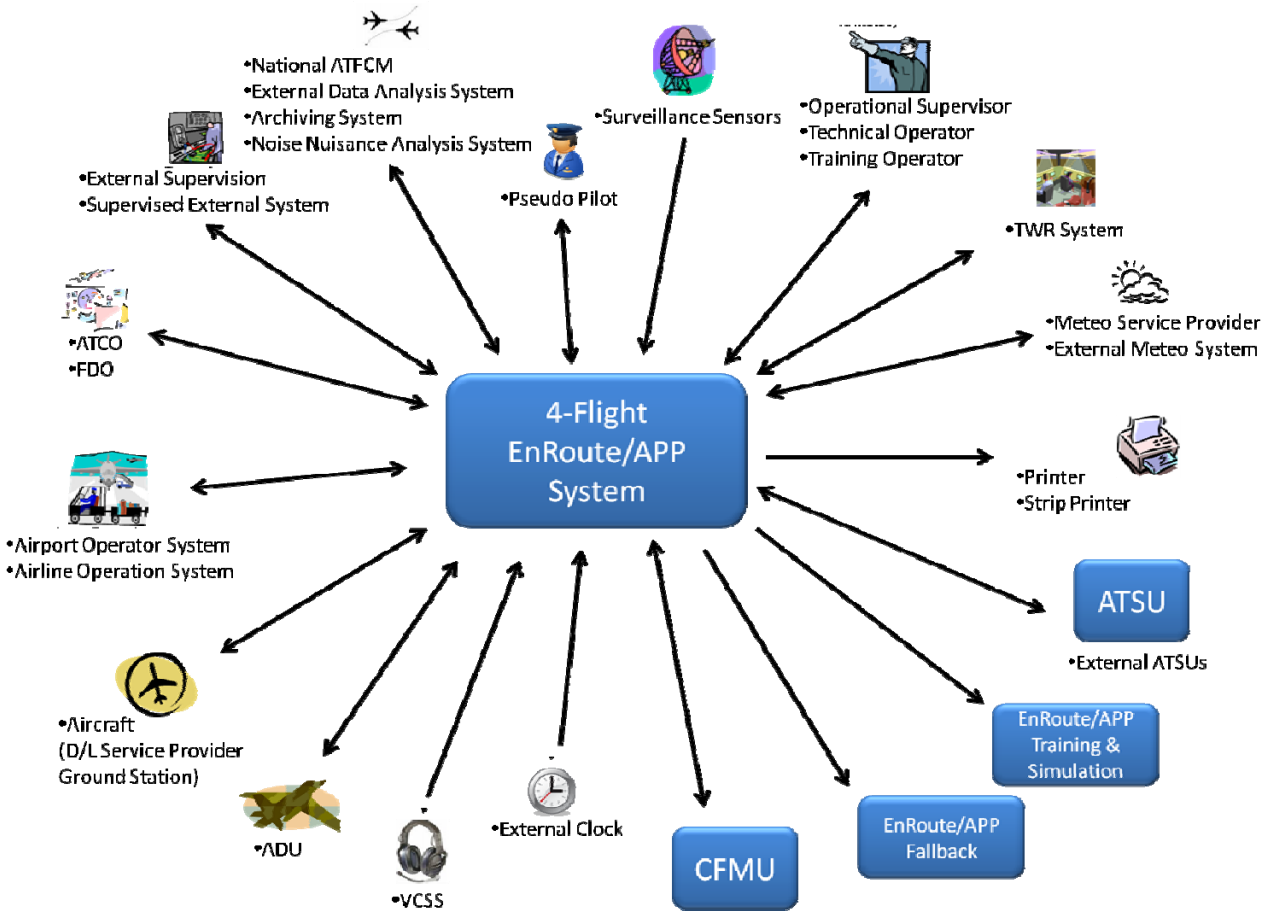


Figure 1: Architecture Context

2.3 4-FLIGHT SYSTEM USERS

The 4-Flight system interconnects different actors (users or other systems); its architecture depicts the external actors (whether they be whole organizations, humans or automated systems) that interact with the System.
The actors and their responsibilities are briefly described in the following sections.

2.3.1 HUMAN ROLES

- **ATCO: Air Traffic Control Officer**
  - **Executive Controller (EC)** is part of the sector team responsible for a designated area. He is responsible for the safe and expeditious flow of all flights operating within his area of responsibility. (En-route EC, Initial APP EC, Intermediate APP EC, Departure EC, etc.).
  - **Planning Controller (PC)** is part of the sector team responsible for a designated area. His principal task is to check the planned trajectory of aircraft intending to enter his control sector for potential separation risk, and to co-ordinate entry/exit conditions leading to conflict-free trajectories (En-route PC, Arrival Sequence PC, Multi Sector Planner).
  - **Military Controller (MC)** is responsible for controlling OAT flights as regards the GAT ones. Military controllers are co-located with civil ones and share a services subset from the 4-Flight (Civil and Military Air Traffic Control mission).
  - **Sequence manager** is in charge of the optimization of the arrival/departure sequence.
  - **Watcher (WTC)** is in charge of the observation of one or more sector for investigation.
  - **Training Supervision Position (TSP)** is in charge of the remotely control and monitor of the mirrored CWP.
  - **Flight Information Service Operator (FISO)** is responsible for flight information services for a designated area.
- **Operational Supervisor** is responsible for the general management of all activities in the Operations Room. (EnRoute and Approach Op. Sup., En-route Supervisor, Approach Supervisor)
- **Flight Data Operator (FDO)** is in charge of amending and correcting the messages rejected by the automatic flight plan creation processing or by the automatic route calculation processing. FDO has also the ability to create manually system flight plans from scratch and to modify and cancel manually any non-activated system flight plans known by the 4-Flight System.
- **Technical Operator:**
  - **Technical Supervisor (TECHSUP)** is responsible for the management of all technical activities in the Technical Room.
  - **Environment Data Preparator** is responsible for environment data preparation.
  - **Playback Analyst** is responsible for running playback data
  - **Data Analyst (or Data Analysis Operator)** is a human operator who analyses recorded data and events or snapshot data for technical purposes.
- **Pseudo Pilot** is a human operator who plays pilot roles on training sectors during a training session.
- **Training Operator** is in charge of managing the training session.

2.3.2 EXTERNAL CLIENTS

- **Surveillance Sensors:** Radars (PSR, SSR and Mode-S radars), ADS/B, Meteo Sensors, Multilateration system.
- **External ATSUs:** IOP compliant ATSU and OLDI compliant ATSU.
- **Tower system:** Aerodrome control unit responsible for the provision of ATC services for flights that are landing or taking off and other traffic active on airport.
- **CFMU:**
  - **Integrated Initial Flight Plan Processing System** (IFPS), enables the reception, processing and delivery of IFR GAT flight plans in the IFPS zone.
  - **European Tactical Flow management System** (ETFMS) delivers CRA messages which can be consumed by the 4-Flight system.
  - **Centralized Airspace Data Function** (CADF), centralized system aimed to support the implementation of the FUA Concept efficiently for the ECAC States.
  - **Centralized Code Allocation Management System** (CCAMS) centralised system aimed to provide a unique Mode3/A SSR Code to each flight operating into European region.
  - **European Aeronautical Information Service system** (EAD), provides a centralized reference database of aeronautical information.
- **Air Defense Unit.** European nations decide independently on matters of national security and defense and reserve the right to control access and use of their national airspace.
- **Meteo Service Provider** provides current and/or forecast weather conditions at, and in vicinity of an aerodrome or within a defined region.
- **Aircraft (Data-link Service Provider Ground Station)** represents the real airframe connected to the ground based system by means of Data-link Service Provider Ground Stations.
- **Airline Operation System** provides air transport services for passengers or freight.
- **Airport Operator System** manages aerodromes in order to facilitate aircraft and vehicles operations on the airport movement area.
- **Voice Communication Switching System (VCSS)** provides services for ground-ground and ground-air voice communications.
- **National ATFCM system** provides ATFCM services at the ATSU level.
- **Archiving system** ensures the archiving of recorded information such as controlled flight plans
- **External Data analysis system:**
  - **Charging & fees systems**, system responsible for the computation of fees for the air traffic control service provision.
  - **Statistics systems** provide support for the incident analysis, charging activities and statistic analysis.
- **External Supervision:** External Supervision System exchanging supervision messages/commands with 4-Flight (e.g. STN)
- **Supervised external System:** Generic external HW exchanging supervision messages/commands with 4-Flight (e.g. switch, server, telephone, workstation, radar, LAN, WAN, power supply, sensor).
- **External Clock,** Time server.
- **External Meteo System,** is in charge of acquiring and providing meteo information, including the provision of the QNH of an airport (e.g. AWOS).
- **Printer:** Device allowing the print of technical reports, statistics and other data required by the eligible operators.
- **Strip Printer:** Device allowing the print of the strips associated to the flights under the

responsibility of an eligible operator.

- **Noise Nuisance Analysis System:** System providing the noise nuisance analysis of the correlated air situation limited to a specific area.
- **EnRoute/APP Fallback:** System maintained as a backup to the 4-Flight System. If a failure occurs in the 4-Flight System, the fallback system takes over.
- **EnRoute/APP Training and Simulation:** System used to simulate the behavior of a 4-Flight system instance and to train the eligible operators on the 4-Flight system instance capabilities.

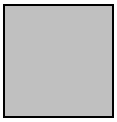
3 REQUIREMENTS

3.1 INTRODUCTION

The User Requirements describe what the 4-Flight System shall/should do in terms of services.
This Service Oriented Approach has been chosen to structure the presentation of the User Requirements (UR). In such a context, the requirements are expressed for the whole 4-Flight En Route/Approach system considered as a black box and providing users (actors and external client) with services. No assumptions are made on the implementation of the services between logical components or sub-systems.
The list of services has been based on 3 levels as presented below.
For each service a description of the outline (level 1 mainly) is given together with the associated requirements, definitions and contextual text.
As far as possible, the user requirements have been produced without imposing design constraints. However, some assumptions have been made on the main architectural principles (See Architectural Documents).

3.2 SERVICES DESCRIPTION

3.2.1 SERVICES IDENTIFICATION



In Step 1, these services are not provided by the 4-Flight Systems directly. However, the 4-Flight system is expected to feed the external systems in charge of these services with required data (SFPL, air tracks,..).

4-Flight System Services			
level 1	**level 2**	**level 3**	**Short Description**
1 – Transversal			This Level 1 service encompasses all the requirements that are transversal to the other level 1 services
2 - Air surveillance	2.1 - Transversal		The level 2 service encompasses all the requirements that are transversal to the other subservices related to air surveillance
	2.2 - Generate air situation picture	2.2.1 - Generate and maintain air situation picture	Generate and keep up-to-date correlated tracks by merging air surveillance sensors (SSR, PSR, ADS/B, multilateration) Provide ATSUs with a real-time air traffic situation picture resulting from the system tracks that belong to the corresponding domain of operation
		2.2.2 - monitor air tracks	Manage warning associated to vertical separation monitoring (RVSM) Manage warning associated to air tracks aging
		2.2.3 - Generate and maintain raw air situation picture	Provide each ATSUs with a real-time raw air situation picture which is derived from radar plots in order to check the air situation

4-Flight System Services			
level 1	**level 2**	**level 3**	**Short Description**
	2.3 - Distribute air surveillance data to external client	2.3.1 - Distribute surveillance data to Air defence organisation	Distribute surveillance data to Air defence organisation
		2.3.2 - Distribute surveillance data to noise nuisance monitoring systems	Distribute surveillance data to noise nuisance monitoring systems
		2.3.3 - Distribute surveillance data to Airport operations	Distribute surveillance data to Airport operations
3 - Surface surveillance	3.1 - Transversal		
	3.2 Display Surface situation picture	3.2.1 - Generate and maintain surface situation picture	Provide tower controllers with airport situational awareness on the movement area by displaying position and identification of all surface traffic (aircraft and vehicles)
	3.3 - Assist surface movement guidance and control	3.3.1 - Detect ground conflict-infringement	Detect and alert potential conflict situations on an airport such as runway incursion, intrusion in a protected area, aircraft/aircraft and aircraft/vehicle collisions
4 - Flight Data Processing	4.1 - Transversal		The level 2 service encompasses all the requirements that are transversal to the other subservices related to flight data processing
	4.2 - Provide assistance for flight plan submission		Provide pilots with assistance for flight plan submission and transmission to IFPS
	4.3 - Manage SFPL	4.3.1 - Create SFPL	Manage SFPL automatic creation Enable controllers, FDO,… to create manually a SFPL (Manage re-entering flights and mixed flights in SFPL creation operation)
		4.3.2 - Notify SFPL	Manage SFPL pre-active segment
		4.3.3 - Activate SFPL	Manage active SFPL Enable manual SFPL segment activation
		4.3.4 -Terminate SFPL	Manage automatic SFPL segment termination Enable manual SFPL segment cancellation Enable manual SFPL segment termination suspension/desuspension
		4.3.5 - Modify SFPL	Manage SFPL modification that results from message reception, controller action, env data modification, air track correlation,.. (Manage re-entering flights and mixed flights in SFPL modification operation)
		4.3.6 - Consult SFPL	Enable Controller, FDO,... to consult a SFPL data
		4.3.7 - Manage departure clearance	Provide controllers with assistance on implementation of departure clearance procedures
		4.3.8 - VFR flights arrival monitoring	Provide controllers with assistance to cope with VFR SFPL management specificities : - generate alerts in case of no landing or report after a predicted time of arrival
	4.4 - Manage SSR Codes		Manage automatic and manual SSR codes allotment Manage SSR code coordination (provision for CCAMs IR)
	4.5 - Correlation		Associate system tracks with the corresponding system flight plans
	4.6 - Assist Flight coordination and transfer	4.6.1 - Provide flight coordination assistance	Manage coordination states Enable automatic and manual flight coordination for the traversal between two responsibilities within a SFPL Manage OLDI coordination messages exchange between external ATSUs
		4.6.2 - Provide flight transfer assistance	Manage transfer states Enable automatic and manual flight transfer between two responsibility traversals within a SFPL Manage OLDI transfer messages exchange between external ATSUs

4-Flight System Services			
level 1	**level 2**	**level 3**	**Short Description**
		4.6.3 - Provide coordination and transfer dialogue tools	Provide controllers with dialogue assistance for negotiating flight coordination (this includes point function, FL Request, Shoot Request, What-if for consultation..)
		4.6.5 - Assist Civil/military coordination	Provide civilian/military controllers with assistance for coordination
	4.7 - Distribute flight plan data	4.7.1 - Distribute flight plan data to other ATSUs	distribute SFPL data to external ATSUs
		4.7.2 - Distribute flight plan data to air defence organisation	Distribute flight plan data to air defence units.
		4.7.3 - Distribute flight plan data to airport operations	Distribute flight plan data to airport operations systems.
		4.7.4 - Distribute flight plan data to CFMU / IFPS	Distribute flight plan data to CFMU / IFPS
	4.8 - Enable What-if context	4.8.1 - Enable tactical constraint simulation	Enable controllers to give simulated orders to flights and to receive the resulting predicted behaviour
	4.9 - Manage trajectory		Manage local trajectory prediction Manage the synchronisation with the global trajectory shared between the concerned client and actors (4D BT is forecast by 2020 . By 2014 it should be possible to assure interoperability at ATSU-ATSU level only)
5 - Controlled air traffic monitoring assistance	5.1 – Transversal		The level 2 service encompasses all the requirements that are transversal to the other subservices related to controlled air traffic monitoring assistance
	5.2 - Provide conflict detection and resolution assistance	5.2.1 - Detect potential conflicts	Detect and update encounters Draft and manage problem interactions Monitor distance between aircraft and identify minimum separation infringement
		5.2.2 - Provide Conflict resolution assistance	Assist controller in analysing traffic by providing contextual views or resolution context Support cooperation between executive and planning controller by building-up a common view of the traffic Support controller decision-making by providing on-demand resolution advisories (Step 2 only).
	5.3 - Provide flight monitoring aids	5.3.1 - Provide flight deviation and conformance monitoring	Detect if a controlled aircraft deviates from its planned trajectory or from its related clearance, notifying deviation warnings to the concerned controllers
		5.3.2 - Provide flight progress monitoring	Keep the trajectory updated with the progress of the flight Detect taking-off, missed approach and landing Provide RVSM warning for non equipped flights
		5.3.3 - Provide reminder tools	Provide reminders of instructions to be issued Provide reminders of potential conflicts to be resolved
6 - Data Presentation to controller	6.1 - Transversal		The level 2 service encompasses all the requirements that are transversal to the other subservices related to data presentation to controller
	6.2 - Display surveillance data	6.2.1 - Display air situation picture	Present controllers with the air situation picture by filtering system tracks (tracks belonging to the Domain of Operation – tracks belonging to an interest volume – tracks corresponding to a specified SSR Code,…)
		6.2.2 - Provide filtering tools for air situation picture presentation	Provide controllers with tools to filter the displayed air situation picture according to various criteria : volumetric, flow oriented, conflict oriented, SSR code, level,..
		6.2.3 - Display raw air situation picture	Display raw air situation picture which is derived from radar plots in order to check the air situation
		6.2.4 - Display ground situation picture	Display ground situation picture which is derived from ground surveillance data

4-Flight System Services			
level 1	**level 2**	**level 3**	**Short Description**
	6.3 - Display safety nets alert		Display STCA, MSAW, APW and APM alert
	6.4 - Display Flight Plan data		Display SFPL data
	6.5 - Display Civil / military coordination data		Display civil/military coordination data
	6.6 - Display controlled air traffic monitoring data		Display conflict oriented data, deviation and non-conformance warning, take-off/landing detection and reminders
	6.7 - Display AGDL data	6.7.1 - Display CPDLC data	Display D/L data which are derived from DLIC, ACM, ACL and AMC services
		6.7.2 - Display DAPs	
	6.8 - Display departures and arrivals sequence data	6.8.1 - Display Departures sequencing data	Limited to Approach DMAN for STEP1
		6.8.2 - Display Arrivals sequencing data	Display Arrival sequence, advisories and Arrival delays
	6.9 Display Operational Env data		Display maps, operational room configuration, air traffic env data, meteorological data,..
	6.10 Display Operational Warnings		Display operational warnings.
7 - Safety Nets	7.1 - Transversal		The level 2 service encompasses all the requirements that are transversal to the other subservices related to safety nets
	7.2 - Provide safety nets	7.2.1 - Detect and display Short Term Conflict Alert	Assist controllers in preventing collision between aircraft by detecting and raising alerts related to potential or actual infringement of separation minima
		7.2.2 - Detect and display minimum safe altitude warning	Provide warnings related to an aircraft descending below a designed minimum safe altitude from the ground or an obstacle
		7.2.3 - Detect and display Area Proximity Warning	Provide warning related to a potential or actual aircraft infringement of restricted area
		7.2.4 - Detect and display Approach Path Monitoring warning	Provide warning related to aircraft deviation from glide path.
8 - Communication assistance	8.1 - Transversal		The level 2 service encompasses all the requirements that are transversal to the other subservices related to communication assistance
	8.2 - Air Ground Data Link Communication assistance	8.2.1 - Manage AGDL communication initialisation (DLIC)	Provide automated assistance for CPDLC communication initialisation between ATC ground systems and aircraft systems
		8.2.2 - Provide AGDL Communication transfer assistance (ACM)	Provide automated assistance for aircrew and controllers for initialising CPDLC dialogue and conducting the communication transfer with the next controllers
		8.2.3 - Provide AGDL Clearance assistance (ACL)	Provide controllers with the capability to issue CPDLC clearance and request for information Provide pilots with the capability to issue CPDLC request for clearance, request for information, information reports and response to CPDLC uplink messages
		8.2.4 - Provide AGDL microphone stuck check assistance (AMC)	Provide controllers with the capability to ask all the aircraft assumed on the logical position to check if the microphone is stuck

4-Flight System Services			
level 1	**level 2**	**level 3**	**Short Description**
		8.2.5 -	**n.a.**
		8.2.6 -	**n.a.**
	8.3 - Ground ground communication assistance		OLDI management - Provision for IOP and SWIM services
9 - Training and Simulation	9.1 - Transversal		The 4-Flight will provide support for simulation activities and training of personnel, providing features to address all steps of training activities: ab initio training, training on unusual situation, training on new environment and on the introduction of new functionalities. As a consequence, it is no use to refine it in subservices.
	9.2 Manage Training and Simulation		
10 - Departures and arrivals handling	10.1 – Transversal		The level 2 service encompasses all the requirements that are transversal to the other subservices related to departures and arrivals handling
	10.2 - Manage departure traffic	10.2.1 - Generate optimal take-off sequence	Provide airport controllers with optimal takeoff sequence planning
		10.2.2 - Assist to respect take-off constraints	Notify non conformance take-off schedule warning to controllers
		10.2.3 - Distribute departures information to external client	
	10.3 - Manage arrival traffic	10.3.1 - Provide optimal arrival sequence planning	Provide controllers with optimal arrival sequence planning and facilities for manual edition of the sequence
		10.3.2 - Provide arrival delays optimization support	Provide arrival delays optimization support
		10.3.3 - Distribute arrivals information to external client	Distribution of advisories to external clients
11 - Environment Data management	11.1 - Transversal		The level 2 service encompasses all the requirements that are transversal to the other subservices related to env data management
	11.2 – Manage on-line Env data		Enable On-line management such as data capture from external cilents Note : manual modification of on-line data is addressed in operation supervision subservice
	11.3 - Manage off-line Env data		Provide tools to create, modify , check consistency, compile from different sources, distribute onto subsystems all the off-line data (airspace definition, air traffic data, …) that are required for the 4-Flight Enable Off-line data to be managed both at a national level and at a local level
	11.4 - Exchange environment data with external client		Distribute Env data to external clients
12 - Supervision	12.1 - Transversal		The level 2 service encompasses all the requirements that are transversal to the other subservices related to supervision
	12.2 - Technical supervision	12.2.1 - Present technical and functional systems status	Monitor system availability Acquire, synthesize and display technical and functional status on all the system hardware/software resources

4-Flight System Services			
level 1	**level 2**	**level 3**	**Short Description**
		12.2.2 - Provide failure detection and analysis assistance	Generate alarm or warning on failure detection Provide support for analysis supervision data (enable queries on historic of events)
		12.2.3 - Provide supervision commands and actions	Accept supervision commands/actions (e.g. (Re)start/stop/stand-by/reset/switch-over) from eligible operators and gives the capability to perform maintenance activities
	12.3 - Operational supervision	12.3.1 Manage OE Mapping	Manage immediate or in-advanced OE Mapping - Display mapping (operational configuration)
		12.3.2 - Manage airspace maps	Display airspace maps (static maps, dynamic maps, sector maps) Provide airspace map management tools
		12.3.3 - Manage SFPL data distribution rules	Enable to modified on-line SFPL data distribution rules
		12.3.4 - Provide dynamic env data modification assistance	Enable an operational supervisor to modify manually the following data: - aerodrome group configuration - runway rate - airspace data (holding area, general approval volume) - frequency plan - CDR and TSA status - SSR code allotment plan - Holding area
		12.3.5 - Display warnings	Display warnings to the operational supervisor
13 - Archiving			
14 - ATFCM			
15 - System Operation and maintenance support	15.1 Transversal		The level 2 service encompasses all the requirements that are transversal to the other subservices related to system operation and maintenance support
	15.2 - Support services for ATM system deployment and configuration	15.2.1 - System version deployment support	Provide means to assist software and data deployment
		15.2.2 -Test and validation support	Provide means to test the system in near-real environment Provide assistance to validate a new system version and to control its performance and capacity in real environment (shadow mode) before going into operational service
		15.2.3 - Start-up and switch-over support	Provide assistance to manage system cut-over, start-up, start-over and switch-over
		15.2.4 - Technical training support	Provide tools for technical staff training on the system
	15.3 - Record Data		Enable to select data to be recorded and to record these data
	15.4 - Provide Data Analysis Facility		Provide Data Analysis Facility on on-line and recorded data
	15.5 - Playback situations		Enable to play-back situations from recorded data

3.2.2 FORMAT OF REQUIREMENTS AND ASSOCIATED ATTRIBUTES

Each User Requirement is presented with the following structure:

PUID	Description *Note:*		
	Applicability:	Category:	Commonality:

PUID: reference of the requirement. It contains as first field, an identification of the level one service (3-4 letters), as second field, an identification of the level 2 service (2-7 letters) and as third field, a number (3 figures).
PUID Prefix: NRDI means National Requirement Document Italian (this field is optional).
Description: Text of the requirement itself;

Attributes:

Applicability:Concerning STEP1 or a following step;
Category: Functional or non functional requirement (F/NF);
Commonality: En-route requirement or common to both en-route and aerodrome (ER/G).

Note: *Free text to clarify the requirements (when necessary)*

Convention on the meanings complies with the following criteria:

- "shall": used to indicate mandatory requirement
- "should", used to indicate a recommended requirement (but not mandatory),
- "may" used to indicate an option (it depends on environment/procedures),
- Generally, requirements with future tense are used as a reference to an intention.

For the identification of requirements the following main indicators have been used:
TRAN: Transversal;
ASUR: Air Surveillance;
SNET: Safety Nets;
FDP: Flight Data Processing;
CMA: Control Monitoring Tools
CWP: Data Presentation;
COM: Communication Support;
QMAN: Arrival Management;
SUPV: Supervision;
ENV: Environmental Data Management;
SIMU: Simulator;
SUPP: Support functions.

3.3 SPECIFICATION CONSTRAINTS

The FDP service corresponds to an existing and available product, described and defined (as a sub-system) through its own SSS; therefore FDP related specifications are the ones described in the associated documentation (rif. Coflight SSS [1]).
The 4-Flight system shall be specified and defined including and reconstructing all the Data Processing services (CORLM, DPR, ENV, FDPS, FPM, REC, TSUP, TL) defined in Coflight, starting from the its SSS.

4 USER REQUIREMENTS

For the definition of the 4-Flight system (e.g. requirements, open issue, description of services) is required to take into account what is stated in the 4-Flight URD.
This has to be integrated with what is reported into the current document.

4.1 TRANSVERSAL

This service deals with transversal requirements that are applicable to all the level 1 services. In addition, this section addresses technical architecture principles to be adopted. These requirements are organized according to the following types:

- General
- Maintainability
- Reliability
- Availability
- Scalability
- Capacity
- Performance
- Security & integrity
- Flexibility
- Integration
- Testability.

4.1.1 GENERAL

TRAN-GEN-001	The 4-Flight system shall be in line with SESAR-IP 1 operational improvement list.		
	Applicability: Step1	Category: NF	Commonality: ER/G
Note: The 4-Flight may take into account SESAR-IP2 operational improvements.			

TRAN-GEN-002	The 4-Flight system shall support 3 missions : - Civil ATC - Military ATC - Civil/Military ATC (co-localized mission).		
	Applicability: Step1	Category: F	Commonality: ER

TRAN-GEN-003	The 4-Flight system shall support 5 states : - Operational state - Training state - Test state - Playback state - Evaluation state.		
	Applicability: Step1	Category: F	Commonality: ER/G

TRAN-GEN-004	The 4-Flight System shall ensure the consistency/coherence among all the system data.		
	Applicability: Step1	Category: F	Commonality: ER/G

TRAN-GEN-005	The 4-Flight system shall be able to manage operations in ACC, APP and partially TWR operational contexts.		
	Applicability: Step1	Category: NF	Commonality: ER

TRAN-GEN-007	The 4-Flight system shall be compliant with all applicable implementing rules.		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-GEN-008	For FDP service, the 4-Flight generic interface shall be based on Coflight generic client interface.		
	Applicability: Step1	Category: NF	Commonality: ER

NRDI-TRAN-GEN-001	A new version of the 4-Flight System shall exhibit full compatibility and no regression compared with the previous version in terms of Quality of Service and offered functions.

	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-GEN-002	The 4-Flight System shall be composed of an open and modular architecture.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-GEN-003	The 4-Flight System shall be deployable on LINUX OS.		
	Applicability: Step1	Category: NF	Commonality: ER/G
Note: The choice of another OS shall be discussed and explained			

NRDI-TRAN-GEN-004	The 4-Flight System for the Playback position shall support Playback in “passive” and “active” modes. The passive mode allows only the visualization and hearing of recorded data, while the active mode allows interaction with the system.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-TRAN-GEN-005	The 4-Flight System shall make available all pertinent data needed for recording and off-line analysis.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-TRAN-GEN-006	The 4-Flight system shall ensure, for each site, that the final QoS is at least not regressive compared to the corresponding legacy system, when will come into operation.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-GEN-007	The 4-Flight System shall be flexible enough to meet new needs, in terms of data and functionalities.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-GEN-008	The 4-Flight System shall be implemented as far as possible using open international standards and their evolutions.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-GEN-009	The 4-Flight System shall be independent of hardware supplier specific features.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-GEN-011	The 4-Flight System shall be comply with Architectural Patterns (MVL, Three-Layer, Publish/Subscribe, Observer Pattern) in order to maximize maintainability		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-GEN-012	The 4-Flight System shall be integrated with existing legacy systems, e.g.: - Remote Towers - STN (External Supervision) - Air Defence Unit - Airport Systems - Surveillance Sensors - National ATFCM system (SIO: Sistemi Informativi Operativi) - External Meteo System (e.g. AWOS) - Fallback System		
	Applicability: Step1	Category: NF	Commonality: ER

NRDI-TRAN-GEN-013	The Coflight product shall be a design constraint for the 4-Flight System.		
	Applicability: Step1	Category: NF	Commonality: ER

Note: Coflight is based on a Cardamom middleware.

NRDI-TRAN-GEN-014	The 4-Flight System shall use the same system track format as the one used by ARTAS (Asterix Cat. 62).		
	Applicability: Step1	Category: NF	Commonality: ER

4.1.2 RELIABILITY

TRAN-REL-001	The 4-Flight system shall be designed to ensure Reliability and portability as defined by [ISO/IEC 9126].		
	Applicability: Step1	Category: NF	Commonality: ER/G
Note: Reliability definition is standardised in "[ISO/IEC 9126]: 1991(E): Information Technology – Software product evaluation – Quality characteristics and guidelines for their use".			

NRDI-TRAN-REL-001	The 4-Flight System shall keep the number of nuisance alerts to an effective minimum		
	Applicability: Step1	Category: NF	Commonality: ER/G
Note: Human factors and local circumstances determine what constitutes an effective minimum			

NRDI-TRAN-REL-002	For each external interface, the 4-Flight System shall check for syntactic error conditions on yhe input parameters		
	Applicability: Step1	Category: NF	Commonality: ER/G
Note: e.g. value out of range, value not in a finite set of possibilities			

NRDI-TRAN-REL-003	For each external interface, the 4-Flight System shall check for semantic error conditions on yhe input parameters		
	Applicability: Step1	Category: NF	Commonality: ER/G
Note: e.g. ABI received after ACT			

4.1.3 MAINTAINABILITY

TRAN-MAIN-001	The 4-Flight system shall be designed to ensure Maintainability as defined by [ISO/IEC 9126].		
	Applicability: Step1	Category: NF	Commonality: ER/G
Note: Maintainability definition is standardised in "[ISO/IEC 9126]: 1991(E): Information Technology – Software product evaluation – Quality characteristics and guidelines for their use".			

TRAN-MAIN-002	The 4-Flight system shall be designed in order to ensure that the evolutions can be accommodated without detrimental impact on system Quality of Service (QoS): - General changeability - Size and capacity - Sources of information - Interoperability - Customers - Functions - Operational concept.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-MAIN-001	The design of the 4-Flight System shall provide facilities to adapt, with a low development effort and limited and localised modification of existing services, interfaces to improved data provider systems.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-	The 4-Flight system shall record the necessary technical and functional probe data to assist in

MAIN-002	the analysis of the system computation		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-MAIN-003	The design of the 4-Flight System shall be able to support the addition of an interface to new or improved data provider systems with a minimal impact on existing interfaces or services		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-MAIN-004	An internal modification to a 4-Flight system service shall have no impact on other services		
	Applicability: Step1	Category: NF	Commonality: ER/G

4.1.4 AVAILABILITY

TRAN-AVA-001	The 4-Flight system shall implement dissimilar channels as required to meet safety objectives for both software and hardware components.		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-AVA-002	The 4-Flight system shall implement failure detection and automatic recovery with no discontinuity of service level.		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-AVA-003	The 4-Flight system shall ensure adequate isolation of its components/functions ie failure of one component/sub-function shall not provide failure of another one.		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-AVA-004	The 4-Flight system components shall be compliant to EC 2096-2005 and EC 482-2008 and national safety requirements.		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-AVA-005	The 4-Flight system shall be designed in such a way that a failure in a non critical function does not affect the correct execution of a critical function.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-AVA-001	The Availability of the 4-Flight System shall be greater than 0.9999.		
	Applicability: Step1	Category: NF	Commonality: ER/G
Note: 0.9999 is more or less 5 minutes per month			

4.1.5 SCALABILITY

TRAN-SCA-001	The 4-Flight system shall be scalable such that the handling of significantly larger quantities of data than those envisaged will be possible. Wherever possible, extending the capacity of the system shall be possible without modification to the software. This increase can be measured by: - Number of flights per sector - Number of flights per unit time - Number of connected clients: control working positions, airports, aircraft operators, etc.		
	Applicability: Step1	Category: NF	Commonality: ER

TRAN-SCA-002	The 4-Flight system shall be scalable to support the size and capacity consequences of: traffic increases, functional evolutions, operational concept evolutions, IOP improvements defined in the CFT from Step 1 to 2 and beyond.		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-SCA-003	The 4-Flight system shall allow to handle non-colocated sites.		
	Applicability: Step1	Category: NF	Commonality: ER

4.1.6 CAPACITY

Some of the following figures are derived from Coflight and ARTAS capacity requirements - However, they shall be consolidated with operational people in order to accomodate the expected capacity needs for STEP1.

TRAN-CAP-001	The 4-Flight system shall apply Coflight and ARTAS capacities.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: Refer to the ARTAS and Coflight referenced documentation.			

TRAN-CAP-002

The 4-Flight system shall meet an agreed level of capacity on, at least, the indicators listed in the following table:

Capacity indicators			
Data Capacity	Air Surveillance	Air tracks	Peak (Unit)
		Plots/Tracks	Peak (Unit/second)
	Safety Nets	STCA Alerts	Peak (Unit)
		MSAW Alerts	Peak (Unit)
		APW Alerts	Peak (Unit)
		Adaptable domain of interest	unit
	Flight Data Pocessing	Created IFR SFPL	Peak (Unit)
		Re-entrance per FPL	Peak (Unit)
	ATC Monitoring Assistance	SFPL eligible for problem/contextual encounters detection	Peak (Unit)
		Problem interaction per CWP	Peak (Unit)
	Data Presentation to Controller	Displayed air tracks per CWP	Peak (Unit)
		Displayed STCA alerts per CWP	Peak (Unit)
		Displayed SFPLs per CWP	Peak (Unit)
	Communication Assistance	D/L connections per system instance	Peak (Unit)
	Departures and Arrivals Handling	SFPL per arrival sequence	Peak (Unit/10 min)
		Runway & aerodrome group configuration per TMA	Unit
	Technical Supervision	Supervised objects	Unit
	Operational Supervision	Supervised objects	Unit
	Environment Data Management	Airways	Unit
		SID per aerodrome	Unit
		STAR per aerodrome	Unit
		Fix / significant point	Unit
		Aerodrome	Unit
		Runway per aerodrome	Unit
		TSA	Unit
		CDR	Unit
		En route	Unit
		TMA	Unit
		CTR	Unit
		Military	Unit
		Domain of Interest	NM^2

			Operational Entity	Unit/ACC
			Local maps	Unit per CWP
			Distributed maps	Unit per ACC
		Training	Simultaneous training sessions	Unit
			Air tracks per training session	Unit
			SFPL per training session	Unit
		Support	Simultaneous system states	Unit per ACC
	System Capacity	Woking Position Capacity	CWP	Unit per ACC
			CWP module	Unit per ACC
			FDO HMI	Unit per ACC
			OpeSup HMI	Unit per ACC
			TecSup HMI	Unit per ACC
	Interface Capacity	External Interface	Radars	Unit per ACC
			OLDI connections	Unit per ACC
			Air Defence Unit	Unit per ACC
			TWR system	Unit per ACC
			CFMU Traffic (IFPS and ETFMS)	Average Msg/day
			EAD Traffic	Average Msg/day
	Applicability: Step1	Category: NF	Commonality: ER	

NRDI-TRAN-CAP-001	The 4-Flight System shall maintain available on on-line storage media all the selected data-of-interest during an agreed period (e.g. 24h).		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-TRAN-CAP-002

The 4-Flight system shall meet an agreed level of capacity on, at least, the indicators listed in the following table:

Capacity indicators			
Data Capacity	Air Surveillance	Air tracks	Peak (Unit)
		Plots	Peak (Unit/second/scan)
		WAM/ADS-B Reports	Peak (Unit/second)
		Radars per ATSU	Unit
	Safety Nets	STCA Alerts	Peak (Unit)
		MSAW Alerts	Peak (Unit)
		APW Alerts	Peak (Unit)
		APM Alerts	Peak (Unit)
		Adaptable domain of interest	unit
	Flight Data Pocessing	Created IFR SFPL	Peak (Unit), (Unit/day)
		Handled SFPL	Peak (Unit/day)
		Handled correlated SFPL	Peak (Unit)
		Re-entrance per FPL	Peak (Unit)
	ATC Monitoring Assistance	SFPL eligible for problem/contextual encounters detection	Peak (Unit)
		Problem interaction per CWP	Peak (Unit)
	Data Presentation to Controller	Displayed air tracks per CWP	Peak (Unit)
		Displayed Secondary Radar plots per CWP	Peak (Unit)
		Displayed Primary Radar plots per CWP	Peak (Unit)
		Displayed WAM/ADS-B Reports per CWP	Peak (Unit)
		Displayed Airspace Maps data per CWP	Peak (Unit)
		Displayed Weather Maps data per CWP	Peak (Unit)
		Displayed ADAT problem items per CWP	Peak (Unit)
		Displayed Flight Sequence Data per CWP	Peak (Unit)
		Displayed SNET Alerts Data per CWP	Peak (Unit)
		Displayed SFPLs per CWP	Peak (Unit)
	Trajectory Prediction	minimum separation distance between TOC and TOD	Unit
		minimum distance to keep ECL	Unit
		maximum separation between trajectory points	Unit
		minimum constraint target duration	Unit

				offset standard turn for speeds	Unit
				enable/disable TP tracing	Unit
				trajectory maximum horizontal difference	Unit
				trajectory maximum vertical difference	Unit
				trajectory maximum temporal difference	Unit
				IOP maximum horizontal difference	Unit
				IOP maximum vertical difference	Unit
				IOP maximum temporal difference	Unit
			Communication Assistance	D/L connections per system instance	Peak (Unit)
			Departures and Arrivals Handling	SFPL per arrival sequence	Peak (Unit/10 min)
				Runway & aerodrome group configuration per TMA	Unit
			Technical Supervision	Supervised objects	Unit
			Operational Supervision	Supervised objects	Unit
			Environment Data Management	Airways	Unit
				SID per aerodrome	Unit
				STAR per aerodrome	Unit
				Link between STARs and each runway	Unit
				IAP	Unit
				Holding Areas	Unit
				Fix / significant point	Unit
				Aerodromes per ATSU	Unit
				Runway per aerodrome	Unit
				TSA	Unit
				ATSU responsible per TSA	Unit
				CDR	Unit
				Alternative routes per CDR	Unit
				En route	Unit
				TMA	Unit
				CTR	Unit
				Military	Unit
				Domain of Interest	NM²
				Operational Entity	Unit/ACC
				Local maps	Unit per CWP
				Distributed maps	Unit per ACC
				Strategic Constraints	Unit
				System instances	Unit
				ATSUs per system instance	Unit
				ATSUs	Unit
				Roles	Unit
				Responsibilities	Unit
				AFTN ATS recipients	Unit
				Default Routes	Unit
				Classes of Aircraft	Unit
				Aircraft types per class of aircraft	Unit
				Companies	Unit
				ATSUs responsible of the definition of the GAV status.	Peak (Unit)
				Max GAV	Peak (Unit)
				ATSUs responsible of the definition of the CDR status.	Peak (Unit)
				Forbidden Points Sequences	Peak (Unit)
				ATSU associated to holding area	Peak (Unit)
				Airspace Change Scripts in the system instance	Peak (Unit)
				General approval flows in a system instance	Peak (Unit)
				Strategic Constraints in the system instance	Peak (Unit)
				Airspace Configurations per system instance	Peak (Unit)
			Training	Simultaneous training sessions	Unit
				Air tracks per training session	Unit
				SFPL per training session	Unit
			Support	On-line Data Storage	Time
				CWP Replay Time	Time
				Simultaneous system states	Unit per ACC
		System Capacity	Woking Position Capacity	CWP	Unit per ACC
				CWP module	Unit per ACC
				FDO HMI	Unit per ACC
				OpeSup HMI	Unit per ACC
				TecSup HMI	Unit per ACC
			Configuration	System configuration units per system instance	Peak (Unit)
				Mapping Partitions per configuration unit	Peak (Unit)
		Interface Capacity	External Interface	Radars	Unit per ACC
				OLDI connections	Unit per ACC
				Air Defence Unit	Unit per ACC
				TWR system	Unit per ACC
				CFMU Traffic (IFPS and ETFMS)	Average Msg/day

			EAD Traffic	Average Msg/day
	Applicability: Step1	Category: NF	Commonality: ER	

NRDI-TRAN-CAP-003	The 4-Flight System shall endorse capacity requirements deriving from IRs unless stated otherwise with more restrictive specific requirements.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-CAP-004	The 4-Flight System shall be non-regressive with respect to end-to-end capacity requirements as for the system currently in operation.		
	Applicability: Step1	Category: NF	Commonality: ER/G

4.1.7 PERFORMANCE

TRAN-PER-001	All components of the 4-Flight system shall be synchronised with one unique external UTC clock distributed by NTP protocol.		
	Applicability: Step1	Category: F	Commonality: ER/G

TRAN-PER-002	The 4-Flight system shall apply CoFlight and ARTAS performances.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: Refer to the ARTAS and Coflight referenced documentation.			

TRAN-PER-003

The 4-Flight system shall meet an agreed level of performance on, at least, the indicators listed in the following table:

Performance indicators		
System performance	Air Surveillance	Separation minima and surveillance data validity
		Surveillance Performance
		Rate of correlation with FDPS
	Safety Nets	Time delay between track update and alert presentation on CWP display
		Time delay between receiving tracks' update and broadcasting alert information
		Number of false/nuisance alerts and warning time
	TP	Accuracy
	HMI	Frozen screen detection
		Lack of data update detection
Response Time	Resulting from users transactions	Operator input/Actions Feedback
		Operator input/Graphic object Selection
		Controller input/SFPL update and consultation
		Controller input/Filtering request
		Operational Supervisor input for Operational room configuration
		Operational Supervisor input for Aerodrome group configuration
		Technical Supervisor input / System Start

				Technical Supervisor input / System Stop
				Technical Supervisor input / Commands
				From FDO (on SFPL)
			To messages	Flight Plan messages (update from OLDI)
				Aircraft messages (CPDLC)
				TSA status message
		System evolution	Configuration evolutions to be set in operation	Operational configuration changes
				Operational configuration changes / Controller inputs
				System state switch over
				Switch over (hot swap / cold swap)
				New component/system version
				National env data modification
		System load	Network Load	Average
				Maximum
			CPU Load	Average
				Maximum
		Initialization and recovery	CWP initialization	Time
			CWP recovery	Time
			System initialization	Time
			Training session initialization	Time
	Applicability: Step1		Category: NF	Commonality: ER

NRDI-TRAN-PER-001

The 4-Flight system shall meet an agreed level of performance on, at least, the indicators listed in the following table:

Performance indicators		
System performance	Air Surveillance	3D Position Accuracy
		3D Position Resolution
		Position Age RMS
		Unusable Mode C Percentage
		Incorrect Mode C Percentage
		Latency time
		Refresh time
		Rate of correlation with FDPS
		Probability of detection
		Probability of Identification
		Probability of False Alarm
		Speed Accuracy
		Speed Resolution
	Safety Nets	Time delay between track update and alert presentation on CWP display
		Time delay between receiving tracks' update and broadcasting alert information
		Number of false/nuisance alerts and warning time
	TP	Accuracy
	Communication Assistance	Time to request aircrafts connection
	System	System Availability
	HMI	Frozen screen detection
		Lack of data update detection
		Re-configuration time
		Cumulated Processing Time
		Update interval RMS
		Update rate
		Update rate after orders
		Supervision Display Detected Failure Time
		Time to CWP replay
Response Time	Resulting from users transactions	Operator input/Actions Feedback
		Operator input/Graphic object Selection

			Controller input/SFPL update and consultation
			Controller input/Filtering request
			Operational Supervisor input for Operational room configuration
			Operational Supervisor input for Aerodrome group configuration
			Technical Supervisor input / System Start
			Technical Supervisor input / System Stop
			Technical Supervisor input / Commands
			From FDO (on SFPL)
		To messages	Flight Plan messages (update from OLDI)
			Aircraft messages (CPDLC)
			TSA status message
		System	Delay on the execution of query on local data
			Detected Failure Time
			Cycle Response Time
	System evolution	Configuration evolutions to be set in operation	Operational configuration changes
			Operational configuration changes / Controller inputs
			System state switch over
			Switch over (hot swap / cold swap)
			New component/system version
			National env data modification
	System load	Network Load	Average
			Maximum
		CPU Load	Average
			Maximum
	Initialization and recovery	CWP initialization	Time
		CWP recovery	Time
		CWP Reconfiguration	Time
		System initialization	Time
		Training session initialization	Time
		Supervision recovery	Time
		Supervision HMI recovery	Time
		System restart time	Time
		System start-up time	Time
		System shut down time	Time
		CTFT	Time
	Applicability: Step1	Category: NF	Commonality: ER

NRDI-TRAN-PER-002	The 4-Flight System shall endorse performance requirements deriving from IRs unless stated otherwise with more restrictive specific requirements.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-PER-003	The 4-Flight System shall be non-regressive with respect to end-to-end performance requirements as for the system currently in operation.		
	Applicability: Step1	Category: NF	Commonality: ER/G

4.1.8 SECURITY & INTEGRITY

TRAN-SEC-001	The 4-Flight system shall maintain consistency between data and presented information.		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-SEC-002	The 4-Flight system shall be equipped with suitable security mechanisms to prevent from corruption or accidental loss of data.		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-SEC-003	The 4-Flight system shall guarantee the integrity and confidentiality of data against illicit attempt to obtain access to such data.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-SEC-001	The 4-Flight System shall support or implement an access policy to the network and the network access capabilities of each service or component shall comply with the ENAV network security architecture.

	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-SEC-003	The security management for the 4-Flight System shall include at least the following: • support for authentication; • control and maintenance of access rights (role-based); • management and administration of encryption keys; • supporting the underlying Network backbone for alert and warning service about abnormal situation including trials or attempts to break the Security System; • User-Id/Password for Technical Support Staff; • Application Data Protection; • security Data and Mechanism Protection;		
	Applicability: Step1	Category: NF	Commonality: ER/G

4.1.9 FLEXIBILITY

TRAN-FLE-001	The 4-flight system should implement internal and external generic interfaces if no mandatory / regulatory interface is required.		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-FLE-002	The 4-Flight system architecture shall be able to adapt to middleware implementation changes.		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-FLE-003	The 4-Flight system shall be designed and implemented in such a way that can be modified/extended easily in the light of future European requirements.		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-FLE-004	The 4-Flight system shall allow flexibility in off-line defining the eligibility attached to each type of received message.		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-FLE-005	The 4-Flight system shall allow flexibility in off-line defining the eligibility attached to each transaction.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-FLE-001	The 4-Flight System shall provide flexibility for consistent modification of system capacity value.		
	Applicability: Step1	Category: NF	Commonality: ER/G
Note: Modification of system capacity requires a regeneration of the 4-Flight System software			

4.1.10 INTEGRATION

TRAN-INT-001	The 4-Flight system shall send the necessary data to the following ENAV / DSNA legacy systems in order to avoid any discontinuity in the Air traffic services: - TWR systems, - ATFCM systems, - Archiving systems, - Charging & fees / statistics systems, - AOIS.		
	Applicability: Step1	Category: F	Commonality: ER
Note: TWR systems include at least TWR CWP, DCL, D-ATIS, DMAN and surface surveillance systems.			

TRAN-INT-002	The 4-Flight system shall receive the necessary data from the ENAV / DSNA TWR systems in order to avoid any discontinuity in the Air traffic services.		
	Applicability: Step1	Category: F	Commonality: ER

TRAN-INT-003	The 4-Flight system shall be interfaced to the national infrastructure (LAN, WAN, power distribution)		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-INT-004	The 4-Flight system shall allow to display AMAN information in the TWR system.		
	Applicability: Step1	Category: F	Commonality: ER

TRAN-INT-005	The 4-Flight system shall allow to display DMAN information coming from the TWR system.		
	Applicability: Step1	Category: F	Commonality: ER

TRAN-INT-006	The middleware used for each component of the 4-Flight system shall be based on the Coflight middleware services (Cardamon) services whenever possible (e.g. whenever no mandatory interface is required - ex: Asterix interface between Artas and Coflight).		
	Applicability: Step1	Category: NF	Commonality: ER

NRDI-TRAN-INT-001	The 4-Flight System shall provide the ability to integrate NDI ARTAS.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-TRAN-INT-002	When the ACC and the TWR are connected, the 4-Flight System shall ensure flight plan alignment between enroute and ground systems/instances.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-TRAN-INT-003	When the ACC and the TWR are again connected, the 4-Flight System shall ensure consistency and alignment between enroute data and ground systems/instances.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-TRAN-INT-004	The 4-Flight System communication network shall comply ISO/OSI protocols and shall be compatible with the following standards: - IPv4; - IPv6.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-INT-005	The 4-Flight System shall provide the ability to integrate NDI CPR		
	Applicability: Step1	Category: NF	Commonality: ER

NRDI-TRAN-INT-006	The 4-Flight System shall be able to receive DCL request from TWR System according to LoA.		
	Applicability: Step1	Category: NF	Commonality: ER

4.1.11 TESTABILITY

TRAN-TES-001	All tests on the 4-Flight system shall be reproducible.		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-TES-002	It shall be possible to run large scale test of the 4-Flight system without the need for extensive provision of hardware.		
	Applicability: Step1	Category: NF	Commonality: ER/G

TRAN-TES-003	The Test 4-Flight system shall be able to capture and analyse system status at the end of a test.		
	Applicability: Step1	Category: F	Commonality: ER/G

TRAN-TES-004	The Test 4-Flight system shall provide facilities to adjust date/time in order to perform a test.		
	Applicability: Step1	Category: F	Commonality: ER/G

TRAN-TES-005	The Test 4-Flight system shall be able to speed up or slow down the execution of a test in order that a long period of time in a test scenario can be simulated in a short period of real-world time.		
	Applicability: Step1	Category: F	Commonality: ER/G

TRAN-TES-006	The Test 4-Flight system shall be able to manage both real and synthetic ATC data for each external interface.		
	Applicability: Step1	Category: F	Commonality: ER/G

TRAN-TES-007	The Test 4-Flight system shall enable recording for each data input and replaying of previously recorded data.		
	Applicability: Step1	Category: F	Commonality: ER/G

TRAN-TES-008	The Test4-Flight system shall enable the editing of any stimulus.		
	Applicability: Step1	Category: F	Commonality: ER/G

TRAN-TES-009	The 4-Flight system shall enable to generate and to input ATC data autonomously at the ATSU or at the development or maintenance sites.		
	Applicability: Step1	Category: F	Commonality: ER

TRAN-TES-010	The 4-Flight system shall allow to record test execution results, to be used in subsequent comparison tests.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-TRAN-TES-0001	The Test Environment shall enable to start a test (or a batch of tests) from any point where the state of the 4-Flight System is known.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-TES-0002	The 4-Flight System shall be provided with a suite of Test Documents describing in detail the procedures for testing the system requirements.		
	Applicability: Step1	Category: NF	Commonality: ER/G

4.1.12 PORTABILITY

NRDI-TRAN-POR-001	The 4-Flight System hardware-dependent functions shall be identified and encapsulated in software components at OS level or middleware level as a minimum, for the system to be independent of hardware supplier specific features.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-POR-002	The 4-Flight System OS-dependent functions shall be identified and encapsulated in software components at OS level or middleware level as a minimum. The 4-Flight System services shall never bypass the middleware to call OS services.		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-POR-003	The 4-Flight System architecture shall be robust against changes of the middleware implementations used by the system.

	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-TRAN-POR-004	It shall be possible to host the system on a reduced number of nodes. Reduced system configurations are typically used in test and training missions.		
	Applicability: Step1	Category: NF	Commonality: ER/G

4.2 AIR SURVEILLANCE

Air surveillance service deals with the surveillance of all airborne targets (3D, time) located in the same Domain of Interest. It is divided into the following subservices :

- - Transversal
- - Generate air situation picture
- - Distribute air surveillance data to external client

Note : Surveillance data distribution to CWP is not described in this section; from a service point of view, it is addressed by the data presentation to controllers (see "Display surveillance data" service).
Air surveillance service provides controllers with airspace situational awareness on the relevant volume of responsibility taking into account all types of available contributions.
Surveillance contributions information (e.g. primary tracks, secondary tracks, and ADS-B) are merged by the service giving to the ATCO the visibility on which sensors are considered by the system.

4.2.1 TRANSVERSAL

This section gathers all the user requirements which are generic to the others subservices. It mainly encompasses high level requirements that are related to ARTAS integration, back-up surveillance system and separation minima.

ASUR-TRAN-002	The 4-Flight System shall interchange data in a standardized format in order to ensure an adequate exchange of information. ASTERIX shall be the standard used for surveillance data. (e.g. 062 Asterix category for track messages and 065 Asterix category for service status messages; 01/02 and 34/48 Asterix Eurocontrol standards for radar plot information; 21/23 Asterix Eurocontrol standards for ADS-B information; 19/20 Asterix Eurocontrol standards for WAM information).		
	Applicability: Step1	Category: NF	Commonality: ER

ASUR-TRAN-003	The 4-Flight system shall be adapted to Eurocontrol standards evolution for SDPS track messages and service status messages.		
	Applicability: Step2	Category: NF	Commonality: ER

ASUR-TRAN-004	The 4-Flight system shall include two surveillance systems with automatic and/or manual switch-over: one is ARTAS, one is a dissimilar fallback with the same performance, interfaces, capabilities as ARTAS.		
	Applicability: Step1	Category: NF	Commonality: ER/G

ASUR-TRAN-005	The 4-Flight system shall provide the eligible technical supervisor with the capability to manually switch-over surveillance system - between ARTAS and Surveillance fallback system and vice versa.		
	Applicability: Step1	Category: F	Commonality: ER

ASUR-TRAN-006	The surveillance system switchover - between ARTAS and Surveillance fallback system and vice versa - shall not affect the functionalities of the system and shall be completely

	transparent to the controller.		
	Applicability: Step1	Category: NF	Commonality: ER

ASUR-TRAN-008	The 4-Flight system shall include enhanced mode S surveillance function and for example, Downlink Aircraft Parameters shall be used.		
	Applicability: Step1	Category: F	Commonality: ER

ASUR-TRAN-009	In multi-radar environment, the RMS (root mean square) of distance between computed and reference position for a global significant set of multiradar tracks and for a sub-set of them in turn, shall be less than x*100 meters for a separation minima of x Nm. X could be 2.5, 3, 5, 8, 10.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: For the Italian System, the figures shall be confirmed during clarification or negociation phases with the validation of representatives of OPS directorate.			

ASUR-TRAN-010	In multi-radar environment, the distance between the reference position and the computed position shall be minimised: - The difference should be less than 30% of the separation minima distance - There should less than 0,1% of differences over 0,5 Nm.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: For the Italian System, the figures shall be confirmed during clarification or negociation phases with the validation of representatives of OPS directorate.			

ASUR-TRAN-011	In multi-radar environment, the extrapolation duration from the plot detection to the presentation on CWP should be minimised: - RMS less than 5s - x/10 s for a separation minima of x Nm. -The total extrapolation duration should be less than 1s (resp 1.5s) for separation minima less than 5 Nm (resp between 5 and 10 Nm).		
	Applicability: Step1	Category: NF	Commonality: ER
Note: For the Italian System, the figures shall be confirmed during clarification or negociation phases with the validation of representatives of OPS directorate.			

ASUR-TRAN-012	In multi-radar environment, the time between two refresh of the same track should be less than: - 5s for a separation minima between 2 and 3 Nm - 8s for a separation minima between 3 and 5 Nm - 10s for a separation minima between 5 to 10 Nm.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: For the Italian System, the figures shall be confirmed during clarification or negociation phases with the validation of representatives of OPS directorate.			

ASUR-TRAN-013	In multi-radar environment, the distance between the reference mode C and the presented mode C shall be minimised: - There should be less than 0,1% differences over 300 ft for stable aircraft. - There should less than 1,5% of differences over 300ft for vertical evolutive aricraft. - There should be no differences over 500 ft.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: For the Italian System, the figures shall be confirmed during clarification or negociation phases with the validation of representatives of OPS directorate.			

ASUR-TRAN-014	In mono-radar environment, the RMS between plot position at detection time and reference position at presentation time for a global significant set of monoradar plots shall be less than x*100 meters for a separation minima of x Nm. X could be 2.5, 3, 5, 8, 10.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: For the Italian System, the figures shall be confirmed during clarification or negociation phases with the validation of representatives of OPS directorate.			

ASUR-TRAN-015	In mono-radar environment, the difference between the reference position at presentation time and the plot position shall be minimised: - The difference should be less than 30% of the separation minima distance - There should less than 0,1% differences over 20% of separation minima.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: For the Italian System, the figures shall be confirmed during clarification or negociation phases with the validation of representatives of OPS directorate.			

ASUR-TRAN-016	In mono-radar environment, the RMS of presented position ages (between time of presentation and time of detection) shall be less than 2.5s.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: For the Italian System, the figures shall be confirmed during clarification or negociation phases with the validation of representatives of OPS directorate.			

ASUR-TRAN-017	In mono-radar environment, a mode C is considered as not usable if its difference with reference mode C at presentation time is over 700 ft. The number of missing or not usable mode C should be less than 4%.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: For the Italian System, the figures shall be confirmed during clarification or negociation phases with the validation of representatives of OPS directorate.			

NRDI-ASUR-TRAN-003	In multi-radar environment, a mode C is considered as not usable if its difference with reference mode C at presentation time is over 700 ft. The number of missing or not usable mode C should be less than 4%.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: The figures shall be confirmed during clarification or negociation phases with the validation of representatives of OPS directorate.			

ASUR-TRAN-018	In mono-radar environment, a mode C is considered as not correct but usable if its difference with reference mode C at presentation time is between 400ft and 700ft. The number of not correct but usable mode C should be less than 0.1%.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: For the Italian System, the figures shall be confirmed during clarification or negociation phases with the validation of representatives of OPS directorate.			

NRDI-ASUR-TRAN-004	In multi-radar environment, a mode C is considered as not correct but usable if its difference with reference mode C at presentation time is between 400ft and 700ft. The number of not correct but usable mode C should be less than 0.1%.		
	Applicability: Step1	Category:	Commonality: ER
Note: The figures shall be confirmed during clarification or negociation phases with the validation of representatives of OPS directorate.ring clarification or negociation phases with the validation of representatives of OPS directorate.			

ASUR-TRAN-019	In mono-radar environment, mode C information older than 12s shall not be presented to the controller.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: For the Italian System, the figures shall be confirmed during clarification or negociation phases with the validation of representatives of OPS directorate.			

ASUR-TRAN-020	In mono-radar environment, the time between two refresh of the same track should be less than: - 5s for a separation minima between 2 and 3 Nm - 8s for a separation minima of 5 Nm - 10s for a separation minima of 8 Nm

	- 12s for a separation minima of 10 Nm.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: For the Italian System, the figures shall be confirmed during clarification or negociation phases with the validation of representatives of OPS directorate.			

ASUR-TRAN-021	In mono-radar environment, there should be no more than two following calculated positions presented to the controller in case of radar detection missing.		
	Applicability: Step1	Category: NF	Commonality: ER

NRDI-ASUR-TRAN-001	The 4-Flight System surveillance system node switchover shall not last longer than an agreed time (e.g. 3 seconds) from the time the execution is decided.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: Referred to ASUR-TRAN-004			

NRDI-ASUR-TRAN-002	The 4-Flight System shall allow to perform the switch-over mechanism according to enforced operational procedures.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Referred to ASUR-TRAN-005			

NRDI-ASUR-TRAN-005	The 4-Flight System shall automatically resume the services after switchover and not change the track numbers.		
	Applicability: Step1	Category: F	Commonality: ER

4.2.2 GENERATE AIR SITUATION PICTURE

Consists of the following sub-services :

- generate and maintain air tracks from data provided by sensors for a Domain of Interest (i.e. generate and maintain an air situation picture)
- generate a raw situation picture
- monitor air tracks in order to detect and present to the controller any decreasing QoS warning related to the air surveillance service

ASUR-GEN-001	The 4-Flight system shall generate a track when it detects that the associated aircraft is located inside the ATSU domain of interest.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The system shall check the validity of data coming from radars according to probalistic rules before creating the air track			

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ASUR-GEN-002	The 4-Flight system shall not distribute a track when it is outside the domain of interest, when the aircraft has landed or no track update for a specific time (eg 24s).		
	Applicability: Step1	Category: F	Commonality: ER

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ASUR-GEN-003	The 4-Flight system shall prevent from the generation of false tracks (not corresponding to real aircraft).		
	Applicability: Step1	Category: NF	Commonality: ER

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ASUR-GEN-004	The 4-Flight system shall take into account at least data coming from the following kind of sources: primary radars, secondary radars, mode S radars, ADS/B, WAM.		
	Applicability: Step1	Category: F	Commonality: ER

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ASUR-GEN-005	The 4-Flight system shall not take into account a radar which is not working properly (for example, end of sector sequencing error, plot radar deconding error, antenna speed rotation instability, UTC time alignment problem etc), or too disturbed or old radar data (noise, garbling).		
	Applicability: Step1	Category: F	Commonality: ER

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ASUR-GEN-006	The 4-Flight system shall notify to the controller a precise information about surveillance sources contributing to the track update.		
	Applicability: Step1	Category: F	Commonality: ER

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ASUR-GEN-007	The 4-Flight system should alert the controllers when the primary radar coverage is lost or degraded.		
	Applicability: Step1	Category: F	Commonality: ER

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ASUR-GEN-008	The 4-Flight system should take into account the aircraft performances and their evolution to generate air situation (i.e. tracker shall implement a multi model of aircraft performances in the extrapolation algorithm).		
	Applicability: Step1	Category: F	Commonality: ER

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ASUR-GEN-009	The 4-Flight system shall provide an extrapolated altitude and a QNH corrected altitude.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The 4-Flight system shall take into account different QNH associated to different airports			

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ASUR-GEN-010	The 4-Flight system shall calculate and provide on request the total number of plots and tracks known by the system.		
	Applicability: Step1	Category: F	Commonality: ER

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ASUR-GEN-012	The 4-Flight system shall provide to the military controllers in civil ATSU, an adapted air situation picture.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The air situation picture is adapted by applying specific filtering.			

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ASUR-GEN-014	The 4-Flight system shall clearly warn the controller that mode C information has not been updated for a specific time (eg 12s).		
	Applicability: Step1	Category: F	Commonality: ER

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ASUR-GEN-015	The 4-Flight system shall not distribute and use a too old mode C information (eg not updated for more than 24s).		
	Applicability: Step1	Category: F	Commonality: ER

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ASUR-GEN-016	The 4-Flight system shall provide the controller with a track marker when the track in the domain of interest, has not been updated for a significant time though no landing has been detected. The marker shall be permanent as far as the controller doesn't decide to remove it.		
	Applicability: Step1	Category: F	Commonality: ER

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ASUR-GEN-017	The 4-Flight system shall provide the controller with the coast status of a track.		
	Applicability: Step1	Category: F	Commonality: ER

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ASUR-GEN-018	The 4Flight system shall be able to receive weather maps data coming from Meteo Radars in Eurocontrol format Asterix cat 8.

	Applicability: Step1	Category: F	Commonality: ER

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NRDI-ASUR-GEN-001	The 4-Flight System shall be able to receive mode S data from Mode S sensors and eligible operators' requests on mode S information.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Referred to ASUR-GEN-004			

4.2.3 DISTRIBUTE AIR SURVEILLANCE DATA TO EXTERNAL CLIENT

Consists in air tracks distribution to Air defense units and to noise nuisance analysis system.

ASUR-DIST-002	The 4-Flight system shall ensure a connection with air defense units.		
	Applicability: Step1	Category: F	Commonality: ER
Note: For France, a connection to 5 air defense units shall be possible.			

ASUR-DIST-006	The 4-Flight system shall provide the noise nuisance analysis system with the correlated air situation limited to a specific area, in Asterix cat 62.		
	Applicability: Step1	Category: F	Commonality: ER
Note: For safety/security reasons, air tracks data are not distributed in real-time.			

ASUR-DIST-007	The 4-Flight system shall provide external users with the air situation in Asterix Cat 62.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-ASUR-DIST-001	The 4-Flight system shall provide CFMU with the correlated air situation in Asterix Cat 62.		
	Applicability: Step1	Category: F	Commonality: ER

4.3 SURFACE SURVEILLANCE

Out of scope for STEP1. To be confirmed for next steps.

4.4 SAFETY NETS

In the 4-Flight STEP1 context, “Safety Nets” has been limited to ground based services.
Safety Nets work primarily on the basis of surveillance data, predicting track positions and analysing them in order to detect potentially dangerous situations (conflict); Safety Nets provide an alert to controllers, in the short term, for potentially hazardous situations in an effective manner and with sufficient warning time for the situation to be resolved.
Safety Nets are suitable to be used in all kinds of airspace adequately covered by the surveillance service.
Safety nets will evolve to meet future demands imposed by, among other things, further traffic increase, changing traffic patterns, FUA, changing aircraft characteristics, further automation in the air and on the ground and, potentially, the introduction of new concepts.
STCA needs to be adapted to new separation modes, in particular if lower separation minima are considered.
The compatibility of the ground-based safety nets and airborne safety nets, in particular ACAS, needs to be improved.
Note : SNET data distribution to CWP are not described in this section. Actually, from a service point of view, this service is addressed by data presentation to controllers (see "Display surveillance data" service).

In Step 2, the availability of improved or new aircraft information through Mode S, ADS and AGDL (DAP) would offer new opportunities to improve Safety nets.
The impact of mode S elementary and/or enhanced Surveillance on the present requirements will have to be taken in account.

4.4.1 TRANSVERSAL

The requirements included in this section are related to the alerts configuration and management.

SNET-TRAN-004	The 4-Flight system shall process only RDPS messages relevant to traffic whithin the SNET Domain of Interest.		
	Applicability: Step1	Category: F	Commonality: ER

SNET-TRAN-023	For each SNET, the 4-Flight system shall allow the off-line definition of different SNET Zones. This definition shall contains at least : - a volume - a status (activated / desactived / test) - a priority - a list of inhibited mode A codes - an alert warning time, - a list of Aerodromes ID and their associated Turn Zone(s), - type of flight, - flight rules.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Note: 1) In a test status SNET zone or inhibition zone, SNET alerts are processed but not distributed to the controller2) additional attributes could be attached to this definition depending on the considered SNET.3) [SNET Zone] are included in the relevant [SNET Domain of Interest].			

SNET-TRAN-002	The 4-Flight system shall process safety nets alerts only in the concerned activated SNET Zone. These zones shall be used to determine : - the specific input data to analyse; - the specific criteria for the safety net alarm detection; - the specific criteria for the safety net alarm distribution.		
	Applicability: Step1	Category: F	Commonality: ER

SNET-TRAN-024	For each SNET Zone, the 4-Flight system shall allow the off-line definition of different SNET inhibition Zones. This definition shall contains at least : - a volume - a status (activated / desactived / test) - a priority.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Note: In a test status SNET inhibition zone, SNET alerts are processed but not distributed to the controller.			

SNET-TRAN-003	The 4-Flight system shall inhibit safety nets alerts process in the activated SNET inhibition Zones. These zones shall be used to determine : - The specific criteria for the safety net detection inhibition; - The specific criteria for the safety net alarm distribution inhibition.		
	Applicability: Step1	Category: F	Commonality: ER

SNET-TRAN-025	The 4-Flight system shall allow an eligible operator to perform dynamic modifications of SNET zones and SNET inhibition zones status resulting from an aerodrome group configuration change or a TSA status change.		
	Applicability: Step1	Category: F	Commonality: ER

SNET-TRAN-008	The 4-Flight system shall process safety nets alerts using RVSM, formation flight and wake turbulence category data, aerodrome group configuration and flight heading intent.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Note: Flight heading intent are calculated by the system with radar tracking data.			

SNET-TRAN-010	The 4-Flight system shall continue to provide a SNET alert as long the alert conditions exist.		
	Applicability: Step1	Category: F	Commonality: ER

SNET-TRAN-022	The 4-Flight system shall be able to distribute safety messages (alert and information) to external clients or on internal interfaces using the Asterix Cat 004.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Note: The external clients to be considered are at least air defence unit, approach centers (if not included in 4-Flight scope)			

SNET-TRAN-011	The 4-Flight system shall classify safety nets types of alerts according to the flight rule and the flight type (IFR, VFR, military flight, …).		
	Applicability: Step1	Category: F	Commonality: ER

SNET-TRAN-005	The 4-Flight system may use aircraft data derived from the Flight Management System (FMS) to process the safety nets alerts.		
	Applicability: Step2	Category: F	Commonality: ER
Note: Note: Planned international developments in air/ground communications include the automatic transfer of FMS data. It is considered that the use of actual aircraft intention data could make a significant contribution to reducing the number of nuisance alerts.The use of actual aircraft intention data could also increase the available warning time in some situations. For example, if it is known that an aircraft's FMS has been programmed to continue a descent beyond a safe level there is no need to delay the alarm until after the aircraft has passed through that level.			

SNET-TRAN-027	The 4-Flight system shall process Safety Nets alerts according to specified criticality level.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-SNET-TRAN-003	The 4-Flight System shall display to the controllers the Safety Nets status.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-SNET-TRAN-004	The 4-flight system shall distribute at the same time alerts/warnings coming from Safety Nets according to one of the following configurable criteria: - all OEs - sectors having the flight in AOR and downstream sectors having the flight in AOI.		
	Applicability: Step1	Category: F	Commonality: ER

4.4.2 PROVIDE SAFETY NETS

The requirements included in this section are related to the following functions constituting the ground based Safety Nets:

- STCA (Short term Conflict Alert), to detect and prevent from potential or current infringement of separation minima between aircraft and aircraft during airborne phases of flight.
- MSAW (Minimum Safe Altitude Warning), to detect and prevent from potential or current infringement of vertical separation minima between aircraft and radar minima.
- APW (Area Proximity Warning), to detect and prevent from potential or current infringement of restricted/temporary segregated airspace between aircraft and protected airspace.
- - APM (Approach Path Monitoring), to detect a flight deviation from the glide path airspace

between aircraft position and defined Glide Path cone.

SNET-PSN-008	For STCA SNET, the 4-Flight system shall allow the off-line definition of different SNET Zone with the following additional parameters: - Separation standards (vertical plane, horizontale plane, time and distance based).		
	Applicability: Step1	Category: F	Commonality: ER

SNET-PSN-009	The 4-Flight system shall process STCA alerts for each flight about to transgress the separation standards attached to the corresponding [SNET Zone].		
	Applicability: Step1	Category: F	Commonality: ER

SNET-PSN-011	In a TMA context, the 4-Flight system shall be able to process STCA alerts taking into account parallel approach specificities		
	Applicability: Step1	Category: F	Commonality: ER

SNET-PSN-012	The 4-Flight system shall keep alive an STCA alert even in the following conditions : - one of the involved conflicting track change its Mode A code and the new code is included in the STCA inhibited Mode A code list - one the the involved conflicting track is entering an activated SNET inhibition zone.		
	Applicability: Step1	Category: F	Commonality: ER

SNET-PSN-013	The 4-Flight system shall set an STCA alarm to not-displayable when it is relevant to an STCA [SNET Zone] containing [pair of rails] (parallel runways) and the following conditions occurs: - the two tracks are located in a [pair of rails] - the distance between the two tracks is greater than the Safety distance, - the variation of true heading with the Rail Cape of the two tracks is less than the acceptable value.		
	Applicability: Step1	Category: F	Commonality: ER

SNET-PSN-014	The 4-Flight system shall be compliant with Eurocontrol Specification for Short Term Conflict Alert (Edition 1.1, 19 May 2009 or its update).		
	Applicability: Step1	Category: NF	Commonality: ER

SNET-PSN-016	The 4-Flight system shall process the MSAW alerts using the [MSAW operational map] which is based on the concerned terrain altitude data model, includes defined obstacles and the defined minimum safe altitude.		
	Applicability: Step1	Category: F	Commonality: ER
Note: For example, a terrain altitude data model based on unitary cells, should have precision not less than 0.5 NM x 0.5 NM cells.			

SNET-PSN-017	The 4-Flight system shall process MSAW alerts for each flight about to transgress the separation standards attached to the corresponding [SNET Zone].		
	Applicability: Step1	Category: F	Commonality: ER

SNET-PSN-018	The 4-Flight system shall be compliant with Eurocontrol Specification for Minimum Safe Altitude Warning (Edition 0.9, 19 May 2009 or its update if any).		
	Applicability: Step1	Category: NF	Commonality: ER

SNET-PSN-022	For APW SNET, the 4-Flight system shall allow the off-line definition of different SNET Zone with the following additional parameters: - SFPL data (flight rule, flight type, ADES, ADEP,…) for correlated track.		
	Applicability: Step1	Category: F	Commonality: ER

SNET-PSN-020	The 4-Flight system shall be compliant with Eurocontrol Specification for Area Proximity Warning (Edition 0.5, 19 May 2009 or its update if any).		
	Applicability: Step1	Category: NF	Commonality: ER

SNET-PSN-024	For APM SNET, the 4-Flight system shall allow the off-line definition of different SNET Zone with the following additional parameters: - Aerodrome ID and runway ID (including the definition of the associated glide path).		
	Applicability: Step1	Category: F	Commonality: ER

SNET-PSN-025	The 4-Flight system shall process APM alerts for each flight deviating from the final approach path attached to the corresponding [SNET Zone].		
	Applicability: Step1	Category: F	Commonality: ER

SNET-PSN-023	The 4-Flight system shall monitor arriving aircraft associated QFU and warn the eligible controller if the detected QFU is unconsistent with the aerodrome group configuration and/or the planned QFU.		
	Applicability: Step1	Category: F	Commonality: ER

SNET-PSN-021	The 4-Flight system shall be compliant with Eurocontrol Specification for Approach Path Monitor (Edition 0.5, 19 May 2009 or its update if any).		
	Applicability: Step1	Category: NF	Commonality: ER

NRDI-SNET-PSN-001	A track is considered STCA eligible when several criteria are valid, like : - its mode A code is eligible - its position is in the STCA activated [SNET Zone].		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-SNET-PSN-003	The 4-Flight System shall process APW alerts for each flight about to infringe an active SNET zone.		
	Applicability: Step1	Category: F	Commonality: ER

4.5 FLIGHT DATA PROCESSING

Flight data processing service deals with the flight plan life cycle from the submission assistance to its termination. It is divided into the following subservices :

- Transversal
- Provide assistance for flight plan submission (out of step 1 scope)
- Manage SFPL
- Manage SSR Code
- Correlation
- Assist Flight coordination and transfer
- Distribute flight plan data
- Enable What-if context
- Manage trajectory

Note 1: Data Processing will be based on Coflight. The following requirements have been provided for completeness and overall consistency. For more details, see Coflight referenced documentation.
Note 2 : In this section, SFPL data distribution to CWP is limited to the served OE determination. Actually, from a service point of view, this service is mainly addressed by data presentation to controller (see "Display flight plan data" service).

Note 3 : Even if FPM function is usually allocated to the FDP subsystem, from a service point of view it is addressed in the controlled air traffic monitoring assistance service (see "provide monitoring aids").

4.5.1 TRANSVERSAL

The requirements included in this service are related to the management, organization and configuration of external interfaces.

FDP-TRAN-003	The 4-Flight system shall manage re-entrant flights in the vertical and/or horizontal plane.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Re-entrancy shall be considered both at the ATSU level and the logical position level.			

FDP-TRAN-004	The 4-Flight system shall check eligibility of each transaction carried out on an SFPL.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TRAN-005	The 4-Flight system shall check eligibility of each received message.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TRAN-007	The 4-Flight system shall support the standard interface with the CFMU system.		
	Applicability: Step1	Category: NF	Commonality: ER

FDP-TRAN-008	The 4-Flight system shall support the standard interface with the CADF systems.		
	Applicability: Step1	Category: NF	Commonality: ER

FDP-TRAN-009	The 4-Flight system shall manage both centralized FDO and local FDO configurations.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: In the French context, FDO are centralized in the CESNAC centre for all the ATSU.			

4.5.2 PROVIDE ASSISTANCE FOR FLIGHT PLAN SUBMISSION

Out of scope for STEP1.

4.5.3 MANAGE SFPL

This service deals with all general treatments for a system flight plan (SFPL):

- creation (for both GAT and OAT flights)
- cancellation
- eligibility
- manual creation

It also concentrates some specific treatments related to particular flights:

- specificity in approach areas (departure clearances)
- dynamic constraints management
- VFR flights
- abbreviated flight plans

Some general requirements are also present at this level that give general principles for SFPL management.

FDP-MAN-001	The 4-Flight system shall manage SFPL for each flight crossing the ATSU AoI (whenever it

	crosses the ATSU AoR or not).		
	Applicability: Step1	Category: F	Commonality: ER

FDP-MAN-002	The 4-Flight system shall be able to handle IFR and VFR flights.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-MAN-003	The 4-Flight system shall be able to handle GAT and OAT flights.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-MAN-004	The 4-Flight system shall manage SFPL for flights with GAT/OAT and/or VFR/IFR transition.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-MAN-005	The 4-Flight system shall manage abbreviated flight plan.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-MAN-006	The 4-Flight system shall enable an eligible operator to create manually an SFPL.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The Operator role encompasses controller or a Flight Data Operator role			

FDP-MAN-007	The 4-Flight system shall create automatically an SFPL on reception of a valid message from CFMU (IFPL/FPL/IAPL/APL/CPL) or from another ACC (BFD/INF/Coordination or notification message) when no existing SFPL can be associated.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-MAN-008	The 4-Flight system shall enable an eligible operator to cancel an SFPL.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The Operator role encompasses controller or a Flight Data Operator role			

FDP-MAN-009	The 4-Flight system shall manage SFPL.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-MAN-010	The 4-Flight system shall enable an eligible operator to modify SFPL data and check the consistency of the modification.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-MAN-011	The 4-Flight system shall enable an eligible operator to consult current and historical data from existing SFPL and its corresponding submitted flight plan.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The Operator role encompasses controller or a Flight Data Operator role			

FDP-MAN-013	the 4-Flight system shall allow in-advance tactical orders/contraints preparation.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-MAN-016	The 4-Flight system shall cope with VFR specificities which include at least the following features : - VFR SFPL creation and management whatever the route is processable or not - In case of not processable route, provision default automatic route (based on off-line defined criteria) whenever it is possible. - VFR flight intentions management and distribution.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-MAN-014	The 4-Flight system shall monitor VFR arrivals and warn the eligible controller when the flight is not stated (manually or automatically) to be arrived after a timeout.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-MAN-015	The 4-Flight system shall provide departure clearance assistance.		
	Applicability: Step1	Category: F	Commonality: ER

4.5.4 MANAGE SSR CODES

This service consists of the Secondary Surveillance Radar (SSR) code management sub-services and coordination.
The service will apply the ORCAM set of rules plus additional rules, such as CCAMS, to optimize the code availability, especially for Mode S compatible flights and regions.

FDP-SSR-001	The 4-Flight system shall manage SSR code allocation to SFPL and its release according to ORCAM rules.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-SSR-002	The 4-Flight system shall manage code coordination with another ACC.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-SSR-003	The 4-Flight system should be compliant with a centralized codes allocation management (interface with CCAMS).		
	Applicability: Step1	Category: F	Commonality: ER

4.5.5 CORRELATION

This service is in charge of all treatments related to correlation between radar tracks and flights; it includes:

- Automatic correlation
- Maintenance of correlation
- Automatic de-correlation and corresponding triggering conditions
- Manual correlation and de-correlation.

FDP-COR-001	The 4-Flight system shall perform automatic correlation between an eligible SFPL and a eligible Mode A or a Mode S air track when the off-line configurable check are satisfied: - SSR code consistency - Mod S address consistency (for mode S air track only) - geographical check - temporal check.		
	Applicability: Step1	Category: F	Commonality: ER
Note: - Automatic correlation shall be carried out for all the eligible air tracks crossing the ATSUs AoI (and not only those which are predicted to cross to ATSUs AoR).- Parameters used for Geographical check could be different in ACC and APP context			

FDP-COR-002	The 4-Flight system shall automatically decorrelate an SFPL and an air track if one of the following conditions is fullfilled : - the SFPL has been terminated - the air track has been suppressed - SSR code has change to a code different from the current SSR code or the following SSR code of the SFPL or which is not an emergency SSR code - the link between FDP and SDP has been lost for a configurable time.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-COR-003	The 4-Flight system shall manage SFPLs and air tracks correlation status.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-COR-004	The 4-Flight system shall enable an eligible controller to correlate or decorrelate an indicated air track and an indicated SFPL manually.		
	Applicability: Step1	Category: F	Commonality: ER

4.5.6 ASSIST FLIGHT COORDINATION AND TRANSFER

Co-ordination refers in this service to the process that precedes the transfer of responsibility of a flight between two controllers; this can happen in several situations :

- co-ordination and transfer of a GAT flight between two GAT controllers,
- co-ordination and transfer of an OAT flight between two OAT controllers,
- transition of flight from GAT to OAT (resp. OAT to GAT) between a GAT (resp. OAT) controller and an OAT (resp. GAT) controllers.

Co-ordination services take into account:

- Coordination and transfer dialogue
- standard/non standard coordination
- Coordination abrogation
- Point Session
- Skip function
- Oceanic clearance.

FDP-COOR-001	The 4-Flight system shall allow automatic and/or manual coordination of a flight between two sectors belonging to the same ATSU or to two different ATSUs.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-COOR-002	the 4-Flight system shall allow an eligible controller to force the coordination with the next downstream sector.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-COOR-003	The 4-Flight system shall allow an eligible controller to modify coordination conditions or to abbrogate a coordination with the downstream or the upstream sector.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-COOR-004	The 4-Flight system shall enable an eligible controller to input manual verbal coordination data (downstream or upstream).		
	Applicability: Step1	Category: F	Commonality: ER

FDP-COOR-005	The 4-Flight system shall allow standard and non standard coordination.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Coordination classification is based on LoA definition.			

FDP-COOR-006	The 4-Flight system shall allow an eligible controller to highlight coordination data.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-COOR-007	The 4-Flight system shall allow point session between two controllers belonging to the same ATSU or to different ATSUs.

	Applicability: Step1	Category: F	Commonality: ER

FDP-COOR-008	The 4-Flight system shall be able to automatically trigger a coordination with the next downstream unit on take-off detection.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-COOR-009	The 4-Flight system shall set a coordination warning when automatic coordination with the next ATSU fails.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TRF-001	The 4-Flight system shall be able to manage flight transfer operations with downstream or Upstream ATSU that are not necessarly compliant with AOC/TOC functionalities		
	Applicability: Step1	Category: F	Commonality: ER
Note: Eligibility should be based on off-line rules			

FDP-TRF-002	The 4-Flight system shall allow an eligible controller to assume a flight.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TRF-003	The 4-Flight system shall allow an eligible controller to transfer a flight to a downstream sector belonging to the same ATSU or to a different ATSU.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TRF-004	The 4-Flight system shall allow an eligible controller the choose the mode of flight transfer between R/T and D/L.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TRF-005	the 4-Flight system shall allow an eligible controller to "skip" assumption of control. In this case, the transfer keeps on going with the following sector as predicted in the flight's trajectory.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TRF-006	The 4-Flight system shall allow an eligible controller to select the next sector when transferring a flight and to skip the initially planned next sector(s) (this case corresponds to a release for delegation).		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TRF-007	The 4-Flight system shall allow an eligible controller to de-assume an assumed flight		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TRF-008	The 4-Flight system shall allow an eligible controller to reclaim a released flight.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TRF-009	The 4-Flight system shall allow an eligible controller to highlight transfer data.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TRF-010	The 4-Flight system shall allow an eligible controller to issue a request on frequency.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The recipient of the ROF is the logical posistion or responsability which transfer state is assumed or released			

FDP-DIAL-001	The 4-Flight system shall allow coordination and transfer dialogues between two controllers

	belonging to the same ATSU or to different ATSUs.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-DIAL-002	The 4-Flight system shall allow coordination and transfer dialogues at the initiative of the giving or the receiving controller.		
	Applicability: Step1	Category: F	Commonality: ER

4.5.7 DISTRIBUTE FLIGHT PLAN DATA

Flight plan data is required to be presented sufficiently in advance in order for the controller to assimilate the information and perform the task. SFPL data is therefore distributed to operational entities automatically.
For this purpose, operational entities have been defined that are the combination of a responsibility (sector, set of runways, ATSU...) and a role (planning control, pre-flight, flight data operator...) and will be the basis for the distribution process.
The basic need for flight plan data distribution concerns flights that are or will be soon under the responsibility of a controller team. There is however a need to get information for flights even if they will normally not be under responsibility, but only for information purposes.
The list of Operational Entities to be served for control or information is computed according to defined distribution rules.
Note : In this section, SFPL data distribution to CWP is limited to the served OE determination. Actually, from a service point of view, it is addressed mainly by data presentation to controller (see "Display flight plan data" service).

FDP-DIST-001	For each SFPL, the 4-Flight system shall define and update the list of OE to be served and informed.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-DIST-002	The 4-Flight system shall distribute a subset of SFPL data to the other ATSUs and external clients (e.g. air defense unit, airport operator system, airline operators, CFMU, TWR systems…) following the SFPL updates and according the distribution rules.		
	Applicability: Step1	Category: F	Commonality: ER
Note: In Step 1, SFPL data shall be transmitted through OLDI, AFTN messages (proprietary messages for the TWR system - see open issue TECH-FDP-001). In Step 2, SFPL data distribution shall be done according to IOP mechanism.			

4.5.8 ENABLE WHAT-IF CONTEXT

The concept of what-if context represents a logical view of the air traffic which can be used by controllers to evaluate the impact of actions they could take.
The ability of providing what-if facilities to controllers is supported by the management of alternative SFPL inside the FDP in order to insure the same treatment for both real and alternative flights.

FDP-WIF-002	The 4-Flight system shall be able to create and manage a what-if context to support tactical order probing and coordination/transfer dialogue.		
	Applicability: Step2	Category: F	Commonality: ER
Note: What-if function has been postponed from Coflight V2 to Coflight V3.			

4.5.9 MANAGE TRAJECTORY

Within a FDPS, the majority of functions to be performed depend on the path through the airspace that each flight will follow and its expected progress along that path in terms of time. This data is referred to as the trajectory and is part of the representation of the flight plan.
This service describes the determination of the 4D trajectory of a flight from take-off until landing for the purpose of the support of Air Traffic Management (ATM) services and applies where the flight plan contains route and level data to be processed.
This service also includes:

- Crossed airspace volumes calculation (AoR and AoI)
- Dynamic Management of Routes
- Constraints and A/C parameters management.

FDP-TP-001	The 4-Flight system shall create, when possible, a 4D predicted trajectory for each managed flight.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The condition "when possible" is only appliable for abbreviated SFPL. For full SPFL, the 4-Flight system shall create a 4D predicted trajectory.			

FDP-TP-002	The 4-Flight system shall calculate a predicted trajectory consistent with the ATC tools accuracy requirements.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: ATC tools encompasses Queue management Tools and Conflict / Problem interaction detection tools.			

FDP-TP-003	The 4-Flight system shall be able to extract, from filed flight plan and according to constraints, a sequence of points and a series of manoeuvre (expanded route).		
	Applicability: Step1	Category: F	Commonality: ER
Note: The 4-Flight system shall be able to manage both IFPS and ICAO routes. The 4-Flight system shall be configurable and able to chose between those two routes.			

FDP-TP-004	The 4-Flight system shall be able to manage routes dynamically depending on CDR and TSA status.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TP-005	The 4-Flight system shall calculate the list of crossed airspace volumes (AoR volumes and AoI volumes) and identify the ones that will be crossed for control and the ones that will be crossed for information.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TP-006	The 4-Flight system shall calculate predicted trajectory by taking into account aircraft parameters, when available.		
	Applicability: Step1	Category: F	Commonality: ER
Note: This requirement is planned to be extended to A/G interoperability in Step 2 - In Step 1, this requirement is limited to static definition of aircraft parameters.			

FDP-TP-008	The 4-Flight system shall calculate predicted trajectory by taking into account all types of constraints (i. e. strategic, tactical and planning included in the flight script).		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TP-009	The 4-Flight system shall calculate predicted trajectory whose climbing/descending profile has been built taking into account ATC strategy and airlines speed laws for economic optimisation, if free from other constraints.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TP-010	The 4-Flight system shall ensure consistency of the predicted trajectory between all services (e.g. conflict tools, FDP, AMAN) each time it is updated.		
	Applicability: Step1	Category: F	Commonality: ER

FDP-TP-011	The 4-Flight system shall determine trajectory relevant points for each SFPL (e.g. Top of Climb point and Top of Descent point).		
	Applicability: Step1	Category: F	Commonality: ER

4.6 CONTROLLED AIR TRAFFIC MONITORING ASSISTANCE

4.6.1 TRANSVERSAL

No commonalities between Conflict oriented and Monitoring functionalities.

4.6.2 PROVIDE CONFLICT DETECTION ABD RESOLUTION ASSISTANCE

In step 1, the controlled air traffic monitoring assistance service aims at supporting the controller in his tasks related to detecting, analysing and solving potential conflicts relevant for the corresponding logical position (e.g. under his responsibility).
To meet this objective, this 4-Flight system shall provide Planning tools (Conflict Detection Planning Tools) and Tactical tools (Conflict Detection Tactical Tools) according to different time horizons respectively .
The planning tool shall :

- detect and update encounters (1) (i. e. flights that are likely to be interfering)
- propose drafts of problem interaction (aggregation of encounters) to be managed by the controller.
- enable the controller to adjust interaction drafts in order to obtain the closest view of his mental representation
- help the controller to analyse the traffic (when integrating a new flight or analysing a potential conflict) by providing flight contextual views or resolution contexts (i.e lowlighting flights identified as non relevant for a selected flight or a selected interaction).

It provides support for the cooperation between the planning controller and the executive controller of the logical position in order to help them to build up a common view of the traffic and spread the common workload in an efficient way.
The tactical tool shall :

- monitor the vertical and horitzontal distance between flight (with air track)
- help the executive controller to identify separation minima infringement between each pair of aircraft taking into account tactical order input (CFL order at least)

(1) note : Only plan-based and aircraft-to-aircraft encounters has been currently considered. However, to provide an exhaustive description of this service, tactical-based and aircraft-to-airspace encounters should be addressed
In step 2, the 4-Flight system should introduce resolution assistance oriented ATC tool. For the time being, there are several R&D projects addressing these needs and several studies have been performed also in the context of Eurocontrol
The “should” is used in the requirements specification to express the willingness of ENAV an DSNA to be provided with an instrument in the direction of more evolutionary conflict resolution assistant tool. This advanced CORA concept shall respond to the ATM 2000+ strategy that identifies requirements to simultaneously generate extra capacity to meet the increasing traffic demand while increasing safety levels. It supports the decision-making process by providing ranked conflict-free resolution advice using a human-centered approach integrating decision support tools,

system functions, and roles and working methods. This tool is primarily designed to operate in European En-Route airspace, however it is not excluded that further development will extend its use to Terminal Areas (TMA).

This tool supports (and not replace) Controller in his decision-making by continuously processing conflict-free resolution advisories and, on controller's request, displaying the ranked ones for the selected problem interaction . The controller is and shall remain at the centre of the ATC safety chain.

CMA-CDPT-001	The 4-Flight system shall identify as eligible for problem/contextual encounters detection, all the flights with an SFPL (full or abbreviated) available in the ATSU.		
	Applicability: Step1	Category: F	Commonality: ER
Note: 1) In case of abbreviated SFPL or uncorrelated SFPL, the service can be degraded according to the data available for processing2) This requirement should be appliable for what-if flights from step 23) This definition should take into account SFPL states4) This may include OAT flights (to be configurable).			

CMA-CDPT-002	The 4-Flight system shall consider as degraded flights for problem/contextual encounters detection when some required flight data is missing or a deviation occurs that does not allow to predict the flight behaviour.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Note:3 different types of "degradation" are envisaged:-horizontal-vertical-horizontal + vertical CDPT works in its standard mode for not degraded data and in case of degradation it has to notice which type of degradation is going on			

CMA-CDPT-003	The 4-Flight system shall detect and manage contextual encounters and problem encounters between eligible flights (degraded or not) and taking into account off-line configurable margins.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-004	The 4-Flight system shall allow off-line definition of the margin related to contextual and problem encounter detection according a set of rules taking into account at least : - type of encounter (ex. problem or contextual) - problem encounter typology (ex. facing, crossing,...).		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-005	The 4-Flight system shall allow an eligible controller to simulate the effects of a clearance on the horizontal and vertical plans (what-if order - including combined orders) related to a single flight before issuing an instruction to the aircrew.		
	Applicability: Step1	Category: F	Commonality: ER
Note: 1) What-if function has been postponed from Coflight V2 to Coflight V3. However, probing tactical order is provided by Erato in the French legacy system.2) As examples, combined orders could be heading/ level or route/ level.			

CMA-CDPT-006	The 4-Flight system shall process contextual and problem encounters for flights subject to what-if orders.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-007	The 4-Flight system shall process contextual and problem encounters for What-if flights.		
	Applicability: Step2	Category: F	Commonality: ER

CMA-CDPT-008	For each logical position, the 4-Flight system shall identify relevant contextual and problem encounters taking into account a set of off-line configurable rules based at least on: - Logical position AoR - Logical position AoI - Logical position coordination/transfer states. - Flight behaviour hypothesis (e.g. climb and descent hypothesis) - Off-line configurable detection margins.		
	Applicability: Step1	Category: F	Commonality: ER
Note: these set of rules are defined separately for contextual encounters and problem encounters.			

CMA-CDPT-009	For a given logical position, the 4-Flight system shall process relevant problem encounters to form a cohesive problem interaction to be considered as a whole by the controller and based on a set of aggregation rules.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-010	The 4-Flight system shall update problem interactions (manually or system created) taking into account any problem encounters detection or modification.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-011	The 4-Flight system shall distribute the relevant problem encounters and problem interactions to the eligible controllers.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-012	The 4-Flight system shall provide the eligible controller with the traffic context of a selected flight defined as : - the flights that are associated to a contextual encounter with the selected flight - the flights with special SSR code - the flights that are not eligible for problem/contextual encounters detection (including primary tracks).		
	Applicability: Step1	Category: F	Commonality: ER
Note: Examples of special SSR code are: 7500, 7600, 7700.			

CMA-CDPT-013	The 4-Flight system shall allow an eligible controller to manually create problem interactions.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-014	The 4-Flight system shall allow an eligible controller to edit, merge or delete problem interactions that have been manually or automatically created.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-015	The 4-Flight system shall create automatic reminder to the controller at an off-line configurable time/distance prior to the start time/location of a problem interaction.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-016	The 4-Flight system shall allow an eligible controller (executive or planning controller sharing the same logical position) to manually adjust the common time/distance (i.e. the one shared by the executive and planner controllers) associated to a selected problem interaction reminder.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-017	The 4-Flight system shall notify the eligible controller that a problem interaction reminder has expired if he does not act for a given time.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-018	The 4-Flight system shall assign to each problem interactions the following attributes at least : - Typology refers to the geometry of the conflict (ex. crossing, facing, converging, overtaking, in trail…) - Category and FL range further detail the operational scenario (ex. Entry, Exit, In sector, Departing/arriving from/to aerodrome) - Origin remainds controllers if the conflict has been created on purpose (ex. system, manual) - Number and identification allow to uniquely identify the flights involved in the conflict - FL range of the problem interaction.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-019	The 4-Flight system shall allow off-line definition of airspace volumes and set of rules (flow oriented, entry point, …) to inhibit problem encounter and problem interaction processing.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-020	The 4-Flight system shall notify problem interaction for deletion or modification to the eligible controllers when it detects that this interaction is deleted or modified (problem encounters update).		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-022	The 4-Flight system shall allow an eligible planning controller to transfer a problem interaction to the executive controllers before the planned time of the automatic transfer.		
	Applicability: Step1	Category: F	Commonality: ER
Note: This UR shall address the case of Multi sector planning.			

CMA-CDPT-023	The 4-Flight system shall allow an eligible controller to transfer the responsibility of a problem interaction to another logical position but he has to be kept informed about conflict evolution.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDPT-024	The 4-Flight system shall allow to online modify the time horizon of a given CWP separately for the executive controller and the planner controller.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDTT-001	The 4-Flight system shall consider as eligible for tactical conflict detection, all the air tracks with identification and altitude report.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDTT-002	The 4-Flight system shall monitor minimum vertical distance and horizontal distance for each pair of eligible air tracks for tactical conflict detection.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Minimum vertical and horizontal distances shall be updated according to a suited periodicity for the tactical conflict detection to be reliable (for ex, this periodicity should be the same as air tracks update).			

CMA-CDTT-003	The 4-Flight system shall detect and manage tactical conflict according to off-line configurable time horizon and margins.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDTT-004	The 4-Flight system shall allow off-line definition of tactical conflict detection margins according to a set of rules taking into account at least : - type of separation (horizontal or vertical) - CFL data availability (the margin shall be wider if the CFL has not been input or for uncorrelated air tracks) - RVSM consideration.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-CDTT-005	The 4-Flight system shall allow off-line definition of inhibition area for the tactical conflict detection.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-ADV-001	For each problem interaction, the 4-Flight system should calculate and update resolution

	advisories which lead to "conflict free trajectories" within the advisory area.		
	Applicability: Step2	Category: F	Commonality: ER
Note: 1) Resolution advisories should take into account airspace and route constraints (ex : TSA and CRD status, uncontrolled airspace, LoA,...)2) This UR is appliable for both automatically created problem interactions and manually created ones.			

CMA-ADV-002	For each problem interaction, the 4-Flight system should rank resolution advisories according to off-line configurable set of rules.		
	Applicability: Step2	Category: F	Commonality: ER

CMA-ADV-003	The 4-Flight system should allow off-line definition of the advisory area at the sector level.		
	Applicability: Step2	Category: NF	Commonality: ER
Note: Advisory area is a configurable area greater than the corresponding sector AoI or logical position AoI.			

NRDI-CMA-TRAN-001	The 4-Flight System shall provide an enable/disable function to de-activate the CMA tool when required.		
	Applicability: Step1	Category: F	Commonality: ER

4.6.3 PROVIDE FLIGHT MONITORING AIDS

The purpose of monitoring aids is to assist the controller in the routine monitoring of the traffic situation, warning the controller when aircraft deviate from their planned route or clearances, reminding the controller of actions that need to be performed, and keeping the trajectories updated with the progress of the flights.

CMA-MONA-001	The 4-Flight system shall set a deviation/non conformance warning when a controlled correlated flight is deviating from its predicted trajectory above a configurable threshold or is not conforming with an applicable tactical order (input in the system).		
	Applicability: Step1	Category: F	Commonality: ER

CMA-MONA-003	As long as a correlated flight remains within configurable tolerances with its assigned route, assigned heading, assigned level or an estimate time over a planned trajectory point, the 4-Flight system shall automatically update its predicted trajectory with the associated air track data.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-MONA-006	The 4-Flight system shall detect aircraft taking-off, missed approach.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-MONA-018	The 4-Flight system shall detect aircraft landing according to different time horizons (e.g. when the aircraft has landed and an off-line configurable time before landing).		
	Applicability: Step1	Category: F	Commonality: ER

CMA-MONA-007	The 4-Flight system shall distribute aircraft taking-off, missed approach and landing information to external clients.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The external clients shall encompass at least airport operation systems and tower systems.			

CMA-MONA-010	The 4-Flight system shall set a RVSM non equipped flight warning when an air track associated to a RVSM non equipped flight entering or remaining in the RVSM area.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-MONA-011	The 4-Flight system shall notify automatic reminders to the controller for a flight communication and control transfer at an off-line configurable time or distance from the

	transfert point.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-MONA-012	The 4-Flight system shall notify a ToD reminder to the controller for a controlled flight at an off-line configurable time or distance from the top of descent point.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-MONA-013	The 4-Flight system shall notify a manual coordination reminder to the eligible controller for a flight to be coordinated with the downstream ATSU whereas no OLDI link is implemented with.		
	Applicability: Step1	Category: F	Commonality: ER
Note: 1) The reminder should be triggered at an off-line configurable time or distance from the coordination point.2) This UR addresses the case of small airport for example.			

CMA-MONA-015	The 4-Flight system shall enable an eligible controller to set or modifiy a manual flight reminder for the corresponding logical position.		
	Applicability: Step1	Category: F	Commonality: ER

CMA-MONA-016	The 4-Flight system shall enable an eligible controller to manually remove a displayed reminder (automatic or manual) of the service "monitoring aids".		
	Applicability: Step1	Category: F	Commonality: ER

CMA-MONA-017	The 4-Flight system shall set a Holding adherence deviation warning when a controlled correlated flight which has received an holding clearance is not conforming with the corresponding offline defined holding volume.		
	Applicability: Step1	Category: F	Commonality: ER

4.7 DATA PRESENTATION TO CONTROLLER

The need to manage an increasing volume of traffic in a more complex environment asks for Controllers to be provided with all the necessary information, in an easy, harmonized and intuitive way, while being supported by new systems and tools. The radar picture is the main centre of attention and through the “electronic environment” controllers can access and manage information and take advantage of new tools and services. Windows and lists completely replace strips.
In this context the CWP represents for Controllers the key component to perform their tasks, the means to interact, through the evolution of working methods, with the 4-Flight system to manage present and future scenari.
The controller will be provided with new and improved tools supporting the automation of the routine task load, giving more precise information on the operational environment (airspace, flights, traffic flows, military activities, etc), giving warnings on potential conflicts, supporting the management of arrival and departures, assisting in the trajectory conformance monitoring, providing warnings by safety nets and exploiting new means of communication (AGDL/GGDL).

4.7.1 TRANSVERSAL

This set of requirements states that controllers shall be provided with updated information and data (coming from different sources) displayed on one or more monitors through an interactive windows based environment. These visualization settings can be personalized by controllers. Controllers are also provided with tools permitting measuring of distances and angles, setting of reminders and triggers as well as cooperation with other controllers at the same or different logical positions.

4.7.1.1 GENERAL HMI PRINCIPLES

CWP-TRAN-015	The 4-Flight system shall indicate clearly to the controller the operated system mission (Civil - Military - Civil/Military) and state (Operational - Training - Test - Playback - Evaluation).		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-003	The 4-Flight system shall be adaptable to different hardware configurations (screens etc).		
	Applicability: Step1	Category: NF	Commonality: ER

CWP-TRAN-007	The 4-Flight system shall provide an interactive environment with direct manipulation.		
	Applicability: Step1	Category: NF	Commonality: ER

CWP-TRAN-008	The 4-Flight system shall allow, if necessary, the visualization of different windows on more than one monitor. The windows shall be accessible with the same input devices.		
	Applicability: Step1	Category: NF	Commonality: ER

CWP-TRAN-009	The 4-Flight system shall be organised into different windows: a main radar window (General radar Picture) on which it is possible to display traffic and air space data and additional windows (Local Data Area, Main Menu Area, Additional windows).		
	Applicability: Step1	Category: NF	Commonality: ER

CWP-TRAN-019	The 4-Flight system shall not allow the iconization of the GRP.		
	Applicability: Step1	Category: NF	Commonality: ER

CWP-TRAN-128	The 4-Flight system shall display additional windows to the GRP so as to be able to visualize all data necessary to the controller. The following types of additional windows are envisaged: - flight lists - system windows - tool windows - history windows - auxiliary and support data window (environment information) - secondary radar picture		
	Applicability: Step1	Category: NF	Commonality: ER

CWP-TRAN-031	The 4-Flight System shall allow to display at least the following flight lists: - sector entry list - departure list - landing list - holding list - special entry list (e.g military flights, manually inserted flights) - VFR list - flight list - coast list - take-off list (take-off sequence and related information - flights are already sequenced before take-off) - flow oriented list - flow restriction list (it contains flights under ATFCM regulations) - outbound list - arrival list (provides sequencing information) -CPDLC Flight List - ATSU/Sector Information (ASI) List.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: The Coast List contains flights, within the area of responsibility of a sector, for which correlation or detection has been interrupted			

CWP-TRAN-032	The 4-Flight system shall display the following system windows:

	- D/L operational Messages IN Window (down-link) - D/L operational Messages OUT Window (up-link) - Diagnostic Window - Frequency Window.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The "system windows" are windows providing for the visualization of events and allowing the execution of tasks			

CWP-TRAN-033	The 4-Flight System shall display the following tool windows: - AMAN sequence list (sequences to the IAF, to any designated fix and to the Runway) - Holding manager window - SNET alarm list - Agenda.		
	Applicability: Step1	Category: F	Commonality: ER
Note: 1) The "tool windows" are linked to the functioning of specific ATC tools and show exclusively data coming from the specific tool AMAN sequence list - sequences to the IAF and Runway, SNET and CDPT alarm lists, Potential Problem Display)2) In step 2, DMAN sequence list is required.			

CWP-TRAN-034	The 4-Flight system shall display the history window.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-027	The 4-Flight system shall allow to present combined information coming from different sources (Surveillance, Flight Plan, ATC Tools, Safety Nets etc).		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-013	The 4-Flight system shall always provide the controller with at least two means to access a function or an information.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: Means can encompass mouse, keyboard, touch screen...			

CWP-TRAN-124	The 4-Flight system shall allow access through a Main Menu Area (MMA) to all windows used to send updates to flight data and/or messages through the data link.		
	Applicability: Step1	Category: NF	Commonality: ER

CWP-TRAN-005	The 4-Flight system shall provide a personalised deactivable "Login" process for each individual controller which allows him to memorize and recall automatically its personal HMI configurations.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-006	The 4-Flight system shall allow the off-line activation / deactivation of the CWP login process for the ATSU.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-016	The 4-Flight system shall allow for the saving/deletion of personalized visualization settings.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-017	The 4-Flight system shall allow the controller to choose the visualization settings from the list of the saved HMI settings or to create and save a new personalized configuration.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-039	The 4-Flight system shall display the HMI default setting upon initialization of the CWP.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-050	The 4-Flight system shall allow the controller to move windows either within the same screen or other screen devices.

	Applicability: Step1	Category: F	Commonality: ER
Note: This capability shall be off-line configurable according to a set of rules to be defined with the Ops (for example ; GRP cannot be moved).			

CWP-TRAN-041	The 4-Flight system shall allow off-line definition of HMI parameters set related to the display of background, information, data, windows, lists, labels, warnings, alarms, alerts,reminders in order to optimize the efficiency and the flexibility of the CWP HMI. These parameters shall encompass at least coding rules (colour, brightness, special symbols, attribute), font rules, luminance, pop-up menu location, display priority (e.g. layering of the views, transparent fill-in, opaque fill-in).		
	Applicability: Step1	Category: F	Commonality: ER
Note: 1) These rules will be specified by ENAV and DSNA according to usability recommandation based on Human-oriented criteria (facility to detect a warning, visual, ability to associate, differentiate or interpret the information, ability to evaluate the priority of the information...) and objected-oriented criteria. In addition, these set of HMI parameters shall be able to varied according to the context (En-route, Approach), the mission (civil; military) and the role (executive controller, planner controller)2) It shall be possible to use colour in order to code either flight status (coordination/transfer states,...) or distinct flows or both.			

CWP-TRAN-035	The 4-Flight system shall allow a controller working position to be configured in order to perform operational supervision activities.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-038	The 4-Flight system shall present data deriving from the recording and playback service in the closest possible form to the screens actually presented to the controllers. The recorded data shall be presented in a synchronized form and in the sequence exactly corresponding to the reality reproduced (HMI and audio data).		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-CWP-TRAN-013	The 4-Flight System shall allow the classification of the information displayed at the CWP to be classified in: - time based deletion - deletion or hidding upon manual confermation - event based displaying		
	Applicability: Step1	Category: F	Commonality: ER
Note: -time based: for those data which are showned or deleted on a temporal basis -event based: for those data which are showned or deleted on an event basis-manual: for those data which are showned or deleted depending on an eligible controller's choice (e.g: open/close window, history dots)			

NRDI-CWP-TRAN-001	The 4-Flight System shall provide for the eligible controller the capability to personalize the presentation of information relating to a flight.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Referred to CWP-TRAN-016			

NRDI-CWP-TRAN-006	The 4-Flight System shall allow the eligible controller to open/close/iconize/restore the SRP on-line		
	Applicability: Step1	Category: NF	Commonality: ER

NRDI-CWP-TRAN-007	The 4-Flight System shall not allow the eligible controller to iconize, close or resize the MMA window.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-008	The 4-Flight System shall allow the eligible controller to move the MMA window on the screen .		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-009	The 4-Flight System shall allow the eligible operational supervisor: modify the Global/Local QNH and TL value, distribute maps, open and close SQR, send messages to the consoles,		

	reconfigure sectors, assign an ATS function and assign a logical function to a CWP.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-010	The 4-Flight System shall display in the menus also options that are temporarily unavailable, in a way distinct from those which are available.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-011	The 4-Flight System shall display windows the default size of which should not be greater than the full size of the screen.		
	Applicability: Step1	Category: NF	Commonality: ER

NRDI-CWP-TRAN-014	The 4-Flight System shall use COTS Graphics Library for presentation management to ensure interoperability in a distributed graphics environment.		
	Applicability: Step1	Category: NF	Commonality: ER

NRDI-CWP-TRAN-015	The 4-Flight System shall associate at each reminder one of the following configurable reminder removal mechanisms: - remove from presentation on ack - remove from presentation on ack followed by remove command.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-016	The 4-Flight system shall allow an eligible controller to send manual reminder to another(s) logical position(s).		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-017	The 4-Flight System shall display both Global and Local QNH.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-018	The 4-Flight System, after a shutdown, shall require a login process at startup.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-019	The 4-Flight System, after a reboot, shall skip the login process and load the last used configuration.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-020	The 4-Flight System shall provide the following kinds of log-in processes: -Automatic: the system shall start-up with a login related to the operational room configuration. -Group ID without password: the system shall request a log-in without password. -ID and password: the system shall request a personal log-in and related password.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-021	The 4-Flight System shall allow, after an automatic log-in, to insert a personal or group log-in without disconnecting.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-022	The 4-Flight System shall allow to configure off-line the log-in process.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-023	The 4-Flight System shall allow to use a CWP as a mirror of another CWP with the capability to remotely monitor and control the mirrored CWP.

	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-024	The 4-Flight System shall allow the TSP position to obtain and release the exclusive control of the observed CWP.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-025	The 4-Flight System shall provide a WTC CWP position in order to observe other CWPs.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-026	The 4-Flight System shall allow off-line enable/inhibit the provision of audio alerts for all the CWPs.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-027	The 4-Flight System shall make available input and output audio devices.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-028	The 4-Flight system shall manage: • Static/dynamic maps o Geographic maps o Local maps • Weather Radar maps.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-029	The 4-Flight system shall allow to display: - logical identifier (15 alphanumeric characters) - ATS unit (15 alphanumeric characters) - pre-assigned sector (15 alphanumeric characters) - operational status: primary/back up/fallback. - physical identifier (15 alphanumeric characters) - ATS function(s) (15 alphanumeric characters) - Absorbed sector(s) (15 alphanumeric characters) - Radar identifier (15 alphanumeric characters).		
	Applicability: Step1	Category: F	Commonality: ER

4.7.1.2 ASSIST MENTAL PICTURE BUILD-UP

CWP-TRAN-042	The 4-Flight system shall always present on the CWP the critical data in a visible way.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-010	The 4-Flight system shall be able to present and update, in a clear and efficient way, at least the following data as soon as they are available: - Surveillance data (including Downlink Aircraft Parameter when available) - Safety nets data - Flight plan data - Environment data - CPDLC data - AMAN/DMAN data - Advanced decision assistance tools data.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Some data shall be presented on demand only.			

CWP-TRAN-046	The 4-Flight system shall allow the controller to access information as quickly as possible.

	Applicability: Step1	Category: NF	Commonality: ER

CWP-TRAN-134	The 4-Flight system shall allow off-line definition of default configurations related to the information to be contained in the windows.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-011	The 4-Flight system shall allow a controller to online customize the presentation of information according to default configurations.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-012	The 4-Flight system shall maintain consistency between data displayed on the different windows.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-028	The 4-Flight system shall allow an eligible controller to online filter and sort the presented information in the flight lists according to off-line defined criteria.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-021	The 4-Flight system shall show and manage a secondary radar picture in an additional window which allows the controller to have a secondary display of the GRP area.		
	Applicability: Step1	Category: NF	Commonality: ER

CWP-TRAN-022	The 4-Flight system shall allow the controller to leave reminders on the main radar screen.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-023	The 4-Flight system shall allow the controller to use R&B vectors to measure and visualize the distance and time between two points (fixed or dynamic) and the respective angle (also indicating clearly the reciprocal).		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-024	The 4-Flight system shall allow the controller to visualize more than one R&B vector at the same time in the radar window.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-029	The 4-Flight system shall allow the controller to visualize concentric circles pointed at a specific point defined by the controller.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Concentric circles distance are off-line configurable.			

CWP-TRAN-026	The 4-Flight system shall show the position and important data (off-line configurable) relating to the aircraft through the “radar display”.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-044	The 4-Flight system shall allow the controller to insert data regarding a flight to be displayed also in case the flight’s track is not displayed on the GRP.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-036	The 4-Flight system shall allow eligible controllers to access any kind of data relevant to the ATSU regardless of filtering or distribution rules.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Normally the controllers needs to access the subset of information needed to control the traffic under is responsibility, including the information relevant to traffic which is not directly controlled but are of interest for the control process.			

NRDI-CWP-TRAN-002	The 4-Flight System shall make the GRP available to all consoles and adapt to the physical characteristics of the screen.		
	Applicability: Step1	Category: NF	Commonality: ER

NRDI-CWP-TRAN-004	The 4-Flight System shall allow the eligible controller to regulate the geographic area shown on the screen both on the GRP and the SRP allowing for gradual shifts (without jumps) high/low left/right.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-005	The 4-Flight System shall allow the eligible controller to configure the minimum and maximum size of the SRP off-line.		
	Applicability: Step1	Category: F	Commonality: ER

4.7.1.3 ENABLE OPTIMIZED CONTROLLER INTERACTIONS

CWP-TRAN-047	The 4-Flight system shall allow the controller to interact with the system by flight information in sensitive fields included in any presentation of a flight (air track label, list).		
	Applicability: Step1	Category: NF	Commonality: ER

CWP-TRAN-018	The 4-Flight system shall allow the activation of frequent commands through dedicated keys on the keyboard. The functions connected to such keys shall be clearly indicated on the keyboard.		
	Applicability: Step1	Category: NF	Commonality: ER

CWP-TRAN-043	The 4-Flight system shall optimize the interaction between controller and CWP to avoid to the controller to duplicate or to repeat the input of same information without detriment of situation awareness or consistency.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: In a Data Link environment, the 4-Flight system shall enable the controller to avoid multiple input of a same clearance for probing (what-if order), transmitting the order to the pilot, and updating the corresponding flight plan data.			

CWP-TRAN-048	Wherever possible, the 4-Flight system shall provide default entries in fields when a form is displayed in form filling interactions.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-030	The 4-Flight system shall help the controller to detect errors as a result of manual data input and to resume the previous situation if needed.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-049	The 4-Flight System shall enable an eligible controller to cancel or to terminate his current transaction.		
	Applicability: Step1	Category: F	Commonality: ER
Note: -Cancel: end of a transaction (for any problem) in order to set up a new one.-Terminate: formal end of a transaction (successfully achieved).			

NRDI-CWP-TRAN-003	The 4-Flight System shall allow the eligible controller to modify on-line the size of the GRP (big/small) and its position (high/low, left/right) through the orders of the predefined screen layout management		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-TRAN-012	The 4-Flight System shall allow for the opening of a single window at a time for data input. [In the case where an eligible controller is trying to open a new window before having finished the task relating to a previously opened window, the HMI should suggest completing the started and unfinished task to the controller.]		

	Applicability: Step1	Category: NF	Commonality: ER

4.7.1.4 SUPPORT COOPERATION BETWEEN CONTROLLERS

CWP-TRAN-014	The 4-Flight system shall provide the controllers (EC/PC) working on the same logical position with at least these cooperation tools : Flight basis - flight annotations (free text) - manual flight reminder (with annotation) - flight attributes highlight - flight highlight - flight integration check mark. Problem interaction basis - annotations per problem interaction (free text) - indicator for problem interactions in consultation Logical position level - problem interaction transfer time - annotations (free text).		
	Applicability: Step1	Category: F	Commonality: ER
Note: 1) In addition, the 4-Flight system shall allow a controller to highlight a flight, flight attributes or to mark a flight integration limited to his CWP.2) The Agenda can be added as such in the list of cooperation tool because it enables a planner controller to communicate with his corresponding excutive one by sharing the same problem interaction data on the common part of their time horizon. However, thisp point is already addressed in CWP-CONFT-0133)The AMAN sequence list can be considered as a cooperation tool between controller too. 4) The 4-Flight system shall ensure consistency of the displayed data to enable cooperation between EC and PC - see TRAN-SEC-001.			

CWP-TRAN-135	The 4-Flight system shall allow a controller to send annotation (free text) to another(s) logical position(s).		
	Applicability: Step1	Category: F	Commonality: ER

CWP-TRAN-136	The 4-Flight system shall allow an eligible controller to highlight a specific flight to (an)other logical position(s).		
	Applicability: Step1	Category: F	Commonality: ER

4.7.2 DISPLAY SURVEILLANCE DATA

This set of requirements states that controllers shall be provided with updated information (position, level, SSR code, forecast vector, history dots, etc.)coming from different sources (PSR, SSR, ADS-B, mono-sensor, multi-radar tracking, etc.). The information are presented according to standard/personal configurations.

CWP-AIRSURV-001	The 4-Flight system shall clearly show the controller the origin of surveillance data in terms of: - single sensor or multi-radar tracker, - list of surveillance sources, - type of track (primary, secondary, combined, ADS-B).		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AIRSURV-002	The 4-Flight system shall smoothly update the presented air situation taking into account surveillance performance requirements.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AIRSURV-003	The 4-Flight system shall indicate clearly to the controller if the surveillance data is to be downgraded.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AIRSURV-004	The 4-Flight system shall indicate the state of correlation of the aircraft.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AIRSURV-007	The 4-Flight system shall be able to show the control sector in charge of each correlated flight.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AIRSURV-008	The 4-Flight system shall allow the controller to select the number of historical points (ranging from zero to a predefined maximum).		
	Applicability: Step1	Category: F	Commonality: ER
Note: Historical points are the position symbols previous to the current one.			

CWP-AIRSURV-009	The 4-Flight system shall allow the controller to visualize and manage on-line forecast vectors.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AIRSURV-010	The 4-Flight system shall allow to configure the information presented to the controller (for example: information contained in the label, lists, etc.) in relation to operational needs.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AIRSURV-011	The 4-Flight system shall allow the eligible controller to on-line activite/deactivate the deconflict function which guarantee the automatic adjustment of the position of the labels, so as to avoid overlapping with radar displayed tracks and other labels.		
	Applicability: Step1	Category: F	Commonality: ER
Note: When the Deconflict function is activated the eligible controller can manually move the position of the label if required.			

CWP-AIRSURV-012	The 4-Flight system shall not allow the controller to visually exclude position symbols/displayed tracks: - in emergency (code A7700, A7600, A7500) - for which warnings have been issued by the Safety Nets - of controlled flights - in a state of handover.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AIRSURV-013	The 4-Flight system shall present to the controller disappearance, decorrelation and displayed track cancellation at least on GRP.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AIRSURV-018	The 4-Flight system shall display information on flights affected by anomalous cancellation of displayed track an alert/warning in the Alarm List window, which will contain: - callsign (name or SSR Code of the flight involved) - last track position.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AIRSURV-014	The 4-Flight system shall allow the controller to choose on-line the air track filters to be activated. The current activated filters shall be clearly displayed.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AIRSURV-015	The 4-Flight system shall allow off-line definition of the different air track filters. These filters shall be a combination of elementary filters based on the following criteria: volumic criteria (Area of responsability volume, Area of Interest volume, Specific volume), Altitude criteria (mode C), SSR code criteria, conflict oriented criteria, correlation state, SFPL data

	based criteria (flight type, flight rules, departure airport, arrival airport, control responsabilities traversal, logical position traversal, coordination states, transfer states, ...).		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AIRSURV-016	The 4-Flight system shall filter the air situation according to the activated air tracks filters.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AIRSURV-017	The 4-Flight system shall allow on-line definition of some air track filters, mainly based on vertical criterias and SSR code criterias.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-AIRSURV-001	The 4-Flight System shall display to an eligible controller flight information in sensitive fields included in any presentation of a flight.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-AIRSURV-002	The 4-Flight System shall allow the eligible controller to interact with the system by flight information in sensitive fields included in any presentation of a flight.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-AIRSURV-003	The 4-Flight System shall allow an eligible controller to activate/de-activate the forecast vector of one or more radar tracks.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Referred to CWP-AIRSURV-009			

NRDI-CWP-AIRSURV-004	The 4-Flight System shall allow an eligible controller to activate/de-activate the forecast vectors for all displayed radar tracks by one and unique function.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Referred to CWP-AIRSURV-009			

NRDI-CWP-AIRSURV-005	The 4-Flight System shall allow an eligible controller to tune, in on-line mode, the forecast vectors in terms of time.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Referred to CWP-AIRSURV-009			

NRDI-CWP-AIRSURV-006	The 4Flight System shall display the flight plan track for monitoring of expected flight position in case of unavailability of radar data.		
	Applicability: Step1	Category: F	Commonality: ER

4.7.3 DISPLAY SAFETY NETS ALERTS

This set of requirements states that controllers shall be provided with alerts (audio/visual) regarding STCA, APW, MSAW, APM.

CWP-SNET-001	The 4-Flight system shall present to the controller alerts provided by the safety nets tools: STCA, MSAW, APW and APM alerts at least on GRP.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-SNET-002	In case of MSAW alert, the 4-Flight system shall provide a configurable audio message while the alert is active. This audio message can be acknowledged by the controller.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-SNET-005	The 4-Flight system shall allow off-line configuration for the exclusion of SNET

	alerts/warnings presentation in all sectors/working positions not concerned with involved flights (e.g. outside of relevant AoI).		
	Applicability: Step1	Category: F	Commonality: ER

CWP-SNET-009	The 4-Flight system shall display alerts/warnings coming from the SNET tool taking into account the exclusion configuration.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-SNET-008	The 4-Flight system shall present the information of flights affected by an STCA/MSAW/APW/APM alert/warning in the Alarm List window.		
	Applicability: Step1	Category: F	Commonality: ER

4.7.4 DISPLAY FLIGHT PLAN DATA

This set of requirements states that controllers shall be provided with complete and updated flight plan data according to distribution rules and operational configurations.

CWP-FDP-001	The 4-Flight system shall warn the controller when its own Area of Responsability is skipped.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-FDP-002	The 4-Flight system shall display updated flight plan data to the eligible controllers taking into account the distribution rules and the operational configuration		
	Applicability: Step1	Category: F	Commonality: ER

CWP-FDP-013	The 4-Flight system shall allow the controller to manage provided "What If" function.		
	Applicability: Step2	Category: F	Commonality: ER

CWP-FDP-014	The 4-Flight system shall allow the controller to manage Point session (to highlight a specific flight plan to other controllers).		
	Applicability: Step1	Category: F	Commonality: ER

CWP-FDP-007	The 4-Flight system shall allow the controller to consult the air traffic control clearances/instructions given to a flight.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-FDP-015	The 4-Flight system shall allow the controller, according to eligibility conditions, to display and manage the flight leg of a flight.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-FDP-016	The 4-Flight system shall allow the controller to display the estimated time over (ETO) each point of importance relevant to a flight leg.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-FDP-003	The 4-Flight system shall be capable of displaying an additional window, the macrolabel, contextualized to a flight and containing information included in the flight plan.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-FDP-017	The 4-Flight system in case of flight is affected by anomalous decorrelation shall display an alarm in the Alarm List window, which will contain: - callsign (name or SSR Code of the flight involved) - last track position.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-FDP-004	The 4-Flight system shall display coordination warning to the eligible controller.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-FDP-001	The 4-Flight System shall display the Flight Leg by a straight or broken line linking every successive point of importance of the trajectory information relative to the time, and estimated level, of the overflight starting from the radar position symbol.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-FDP-002	The 4-Flight System shall allow an eligible controller to activate or deactivated the flight's Flight Leg by the flight Label.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-FDP-003	The 4-Fligh System shall be able to display an enhanced label to the controller, containing at least complementary information related to flight plan, data link messages and ATC tools. The Track label shall integrate Data Link and Mode S/ADS-B information.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-FDP-004	The 4-Flight System shall allow non-colocated CWPs (TWR) to print flight plans.		
	Applicability: Step1	Category: F	Commonality: ER

4.7.5 DISPLAY CIVIL/MILITARY COORDINATION DATA

Out of scope for Step 1.

4.7.1 DISPLAY CONTROLLED AIR TRAFFIC MONITORING DATA

This set of requirements deals with data to be displayed to :

- support controller decision-making related to potential conflict detection and resolution.
- assist the controller in the routine monitoring of traffic

This includes task scheduler management, flight route extrapolation (i e elastic flight leg), traffic context / resolution context display, deviation and non conformance warning display, reminder display.

In step 2, Advanced CORA concepts are expected to be implemented in the 4-Flight system. As a result, Resolution advisories would be displayed to the controller (on demand only).

CWP-MONIT-038	The 4-Flight system shall display automatic reminder for the controller depending on the reminder type : conflict oriented, transfer, ToD…		
	Applicability: Step1	Category: F	Commonality: ER
Note: Reminder should be mainly displayed in the GRP close to the associated air track as a warning when triggered and as a point in the flight leg but may be presented in the Agenda if available.			

CWP-MONIT-039	The 4-Flight system shall display manual reminder to each CWP of the logical position on which it has been set.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-MONIT-040	The 4-Flight system shall allow an eligible controller to set a manual flight reminder on the main radar screens associated to the CWP.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-MONIT-006	The 4-Flight system present RVSM non equipped flight warning to the eligible controllers.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-MONIT-005	The 4-Flight system present deviation/non conformance warning to the eligible controllers.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-CONFT-001	The 4-Flight system shall allow an eligible controller to quickly identify the flights for which encounter/problem interaction detection cannot be performed (at least on the GRP).		
	Applicability: Step1	Category: F	Commonality: ER

CWP-CONFT-003	The 4-Flight system shall allow an eligible controller to emphasize the traffic context of a selected flight.		
	Applicability: Step1	Category: F	Commonality: ER
Note: This requirement can be satisfied either by lowlighting all the flights identified as non relevant as regards the selected flight or by highlighting all the flights associated to this traffic context.			

CWP-CONFT-004	When issuing a what-if order on a flight, the 4-Flight system shall display the updated traffic context of the flight.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-CONFT-005	The 4-Flight system shall allow an eligible controller to emphasize the traffic context associated to a what-if flight.		
	Applicability: Step2	Category: F	Commonality: ER

CWP-CONFT-006	The 4-Flight system shall allow en eligible controller to consult the traffic context associated to a selected problem interaction.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The context traffic of an interaction is somehow the compilation of the traffic contexts of all the flights associated to the interaction.			

CWP-CONFT-007	On an interaction traffic context consultation, the 4-Flight system shall display the flight route legs for all the flights associated to the problem interaction.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-CONFT-008	The 4-Flight system shall allow an eligible controller to extrapolate the position of all the flights associated to a selected flight traffic context along their predicted trajectories.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-CONFT-009	In case of what-if order, the 4-Flight system shall allow an eligible controller to extrapolate the position of all the flights associated to a selected flight traffic context along their simulated trajectories.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-CONFT-010	The 4-Flight system shall allow an eligible controller to extrapolate the position of all flights associated to a given problem interaction according to their predicted trajectories.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-CONFT-011	The 4-Flight system shall allow an eligible controller to select two flights and display an updated indication of a minimum predicted horizontal distance.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-CONFT-017	The 4-Flight system shall automatically display problem interactions to the eligible controller according to an online configurable time horizon.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The time horizon shall be online configurable separately for the executive controller and the planner controller for each logical position.			

CWP-CONFT-012	The 4-Flight System shall display problem interaction to the eligible controller in the Agenda according to a chronological order.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-CONFT-013	For a given logical position, the 4-Flight system shall allow executive and planning controller to share the same problem interaction data but with the possibility to adjust their time horizons separately.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-CONFT-014	The 4-Flight system shall notify to the eligible controller that an already consulted traffic context contains a new relevant flight.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-CONFT-016	The 4-Flight system shall display tactical conflicts (in the GRP at least) to the eligible controllers.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-ADV-001	The 4-Flight system shall allow an eligible controller to request and consult resolution advisories to solve a selected problem interaction.		
	Applicability: Step2	Category: F	Commonality: ER

CWP-ADV-002	Once an eligible controller has selected and confirmed a resolution advisory, the 4-Flight system shall support the alignment of the flight trajectories accordingly.		
	Applicability: Step2	Category: F	Commonality: ER

CWP-ADV-003	The 4-Flight system shall display the possible resolution advisories ranked according to an off-line configuration set of rules.		
	Applicability: Step2	Category: F	Commonality: ER
Note: Once resolutions are generated, the calculation of their cost-value is triggered. This cost-value combines weighted criteria such as : - Priority rules on aircraft manœuvres- Minimum manœuvres principle- Controller workload- Pilot workload- Companies preferences.			

CWP-ADV-004	The 4-Flight system shall allow the off-line definition of the minimum and maximum numbers of possible resolution advisories to be displayed.		
	Applicability: Step2	Category: F	Commonality: ER

CWP-ADV-005	The 4-Flight system shall allow the access (request & display) of resolution advisories on the GRP and the Agenda.		
	Applicability: Step2	Category: F	Commonality: ER

CWP-ADV-006	The 4-Flight system shall allow the display of resolution advisories specifying manœuvres according to the vertical and the horizontal plans.		
	Applicability: Step2	Category: F	Commonality: ER
Note: On the GRP at least the graphical view (horizontal and vertical) should be displayed. A possible solution could be the display of the flight route legs representing the expected behaviour of the flight of applying the resolution. On the lateral plane, the following item should be specified :angle (x degrees left/right)On the longitudinal plane, the following item should be specified: knots +/- On the vertical plane, the following item should be specified : 1) +/- altitude 2) rate to climb/descent.			

NRDI-CWP-MONIT-001	The 4-Flight System shall provide an eligible controller with data regarding deviation from the flight's real trajectory and the corresponding system trajectory in relation to: - longitudinal dimension (based on temporal criteria); - vertical dimension; - lateral dimension; - speed; - vertical ratio of climb/descent; - projection of the aircraft position to ground (i.e. ground track).

	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-MONIT-002	The 4-Flight System shall provide an eligible controller with a warning regarding the non-conformance of a flight with respect to tactical constraints: - Heading; - Assigned Speed (IAS); - Vertical Rate of Climb/Descent; - CFL; - Holding or air space occuped for manoeuvres.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-MONIT-003	The 4-Flight System shall indicate unequivocally to an eligible controller the flight trajectory deviation or non-conformance to which the warning relates.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-MONIT-004	The 4-Flight System shall warn the eligible controllers of interruption or dysfunction of the "advanced decision assistance tools" service through a visual warning.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-CMA-001	The 4-Flight System shall allow an eligible operator to highlight potential conflicts and resolution proposals to other OEs.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The destination OEs can belong to the same ATSU or to an external ATSU.			

NRDI-CWP-CMA-002	The 4-Flight system shall allow an eligible operator to accept/reject resolution proposals.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-CMA-003	The 4-Flight system shall be able to display acceptance/rejection of resolution proposals.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-CMA-004	The 4-Flight System shall notify when CMA tool is disabled.		
	Applicability: Step1	Category: F	Commonality: ER

4.7.2 DISPLAY AGDL DATA

This set of requirements states that controllers shall be provided with the capability to communicate via data-link as well as to change from data link to radio telecommunication.

CWP-AGDL-001	The 4-Flight system shall allow the enabling and disabling of D/L communications for each individual aircraft.		
	Applicability: Step1	Category: F	Commonality: ER
Note: This can be handled automatically by the system or manually by an eligible controller. The manual intervention shall be configurable at local level.			

CWP-AGDL-008	The 4-Flight system shall allow an eligible controller to close CPDLC dialogues with a given flight either on an individual basis (dialogue by dialogue) or in a global way (all dialogues at once).		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AGDL-002	The 4-Flight system shall ensure that the controller always has the chance to conclude any task started via D/L in R/T mode.

	Applicability: Step1	Category: F	Commonality: ER

CWP-AGDL-003	The 4-Flight system shall display in a visible manner the incoming operational message (i.e. The system shall make this information clearly perceptible).		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AGDL-005	The 4-Flight system shall enable controllers to manage D/L communications as non time critical events. Any D/L event shall be non intrusive in operator course of actions. The 4-Flight system shall allow to store pending dialogues in a manner that permits timely and convenient retrieval when needed.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AGDL-007	The 4-Flight system shall warn the eligible controller if no answer or acknowledgement to an uplink message which requires a response from the aircraft has been received within an off-line configurable time.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AGDL-010	The 4-Flight system shall allow an eligible controller to get the historic view of the D/L messages exchanged with a selected flight.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-AGDL-026	The 4-Flight system shall allow controllers to easily identify the following flights on the GRP: - the flights that are currently CPLDC authorized (e.g. D/L connection + CDA) - the flights that are CPDLC enable (CPDLC authorized + eligible for CPDLC communication with the logical position).		
	Applicability: Step1	Category: F	Commonality: ER
Note: A CPDLC authorized status shall be considered at the ATSU level. A CPDLC enable status shall be considered at the logical position level.			

NRDI-CWP-AGDL-006	The 4-Flight System shall support datalink CPDLC service DLIC, ACM, AMC. ACL message exchange.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-AGDL-001	The 4-Flight System shall be able to present information coming from Mode-S both elementary and enhanced surveillane at least in the macrolabel.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-AGDL-002	The 4-Flight System shall allow an eligible controller to choose the field to be displayed related to Mode S elementary and enhanced surveillance information, as defined off-line.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-AGDL-003	The 4-Flight System shall allow the eligible controller to activate/deactivate D/L services for the entire position		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-AGDL-004	The 4-Flight System shall be able to present to an eligible controller D/L connection errors with a given flight (e.g. message timeout, connection loss)		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-AGDL-005	The 4-Flight System shall allow the eligible controller to close the open CDPLC dialogues: - manually - automatically (confirmed by manual ACK)		
	Applicability: Step1	Category: F	Commonality: ER

4.7.3 DISPLAY DEPARTURES AND ARRIVALS SEQUENCE DATA

This set of requirements states that controllers shall be provided with data and assistance coming from Arrival/Departure Manager. See TECH-DMAN-001 open issue as regards DMAN date display.

CWP-QMAN-001	The 4-Flight system shall display flights in the AMAN sequence list according to a time line.		
	Applicability: Step1	Category: NF	Commonality: ER

CWP-QMAN-002	The 4-Flight system shall allow off-line customization of the AMAN sequence list to sort and display flights according to QFU or sequencing point (IAF or designated fix) or QFU + sequencing point.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-QMAN-003	The 4-Flight system shall be able to display AMAN related data onto CWP, including the GRP.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-QMAN-004	The 4-Flight system shall allow to manually input AMAN related data either from the GRP or from the AMAN sequence list.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-QMAN-001	The 4-Flight System shall display advisories generated by AMAN.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Referred to CWP-QMAN-001/003			

NRDI-CWP-QMAN-002	The 4-Flight System shall display the sequence list (e.g. sequence list, landing list) issued by AMAN		
	Applicability: Step1	Category: F	Commonality: ER
Note: Referred to CWP-QMAN-001/003			

NRDI-CWP-QMAN-003	The 4-Flight System shall show the information on the sequencing of aircraft at determined points, coming from the AMAN tool, in the appropriate “Sequence List” window.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Referred to CWP-QMAN-001/003			

NRDI-CWP-QMAN-006	The 4-Flight System shall allow to display AMAN advisories deriving from external ATSUs.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-QMAN-007	The 4-Flight System shall notify when AMAN tool is disabled.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-DMAN-001	The 4-Flight system shall display the departure sequence list issued by DMAN.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-GSUR-001	The 4-Flight system shall display information, deriving fom the ground surveillance system, relevant to aircraft in the RWY Holding Position.

	Applicability: Step1	Category: F	Commonality: ER

4.7.4 DISPLAY OPERATIONAL ENV DATA

This set of requirements states that controllers shall be provided with messages coming from the Operational Supervisor, with local/distributed maps, with operational Env data.

CWP-MAPS-002	The 4-Flight system shall display automatically the distributed maps (including TSA and CDR) when effectively activated according to off-line defined rules.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-MAPS-003	The 4-Flight system shall allow only eligible operators, in on-line mode, to effect any type of operation (creation, saving, modification, cancellation, etc.) on the distributed maps.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-MAPS-004	The 4-Flight system shall allow the controller, when in on-line mode, to create, save, modify or cancel local maps connected to own profile, using an appropriate “map editor”.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-MAPS-001	The 4-Flight System shall allow an eligible controller to cancel objects from maps globally ore selectively.		
	Applicability: Step1	Category: F	Commonality: ER/G

CWP-ENV-001	The 4-Flight system shall display to the controller free-text messages coming from the operational supervisor.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-ENV-002	The 4-Flight System shall display at least the following information: - meteorological information - NOTAM in force - aircraft type and performance - aerodrome facilities (RWY, SID, STAR,etc) - radio frequencies - radio aids (location, indicator, frequency,…) - holding details (holding separation minima, pattern) - sectors configuration - LoAs data - AIP data and maps -ODS-P (ordini di servizio permanenti), ODS-T (ord.serv. temporanei) -CI (Circolari) -DI (Disposizioni) -IPI (Istruzioni Permanenti Interne) -Checklist delle contigencies -Cheklist delle emergencies -Numero MFC (Multi Frequency Code - numero tel enti limitrofi) -User Manual CWP Open/Backup/Fallback.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-WEA-001	The 4-Flight system shall display the radar weather maps.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-WEA-002	The 4-Flight radar weather map display shall be made in such way it doesn’t impact (i.e. hide) on the visualization of the foreground information such as track labels, flight plan list, etc.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-CWP-ENV-001	The 4-Flight System shall show airspace using ATC-type distributed maps which include at least: -FIR borders, -TMA borders, -CTR borders, -ATZ borders, -sector borders, -the "my sector" area, -flight paths, -SID and STAR, -navigational radio aid points, -route points, -significant navigational landmarks, -airports and aerodromes, -Runways, -Radar minimums, -Runway axis lengthening, -SPR (Reserved Air Spaces – Forbidden Zone, Regulated Zone, Dangerous Zone and Temporarily Reserved Zone), PRD/TSA, -Test Transponder, -NTZ (non Transgression Zone), -VFR Route, -Radar/Meteo position, -Center of system.		
	Applicability: Step1	Category: F	Commonality: ER

4.7.5 DISPLAY OPERATIONAL WARNING

This set of requirements states that controllers shall be provided with operational warnings.

CWP-WARN-001	The 4-Flight system shall warn the controller of interruption or malfunction of any services that are configured to be delivered on its HMI.		
	Applicability: Step1	Category: F	Commonality: ER

CWP-WARN-002	The 4-Flight system shall enable the controller to be warned when its HMI is frozen.		
	Applicability: Step1	Category: F	Commonality: ER

4.8 COMMUNICATION ASSISTANCE

4.8.1 TRANSVERSAL

4.8.2 AIR GROUND DATA LINK COMMUNICATION ASSISTANCE

In the 4-Flight STEP1 context, "Air Ground communication assistance" has been limited to the following D/L services : DLIC, ACM, ACL and AMC.
DLIC service aims at providing the necessary information to make data link communications available between an ATSU and aircraft. This service is in charge of :

- unambiguously associating flight data derived from the aircraft with a SFPL;
- exchanging the supported application type and version information and to deliver application address information;
- forwarding the logon parameters to the next crossed ATSU.

ACM service provides automated assistance to flight crew and controllers for conducting the transfer of ATC communications (voice and CPDLC), respecting the operational rule that there is only one ATC controlling authority. It permits the following:

- the initial establishment of CPDLC connection with an ATSU;
- the transfer via CPDLC and/or voice of a flight from one ATSU to the next ATSU, or the instruction to change voice channels within an ATSU or sector;
- the termination of CPDLC connection with an ATSU.
- ACL service allows flight crew and controllers to conduct operational exchanges. It permits:
- flight crew to make requests and reports to controllers;
- controllers to issue clearances, instructions and notifications to flight crew.

ACL is intended for use in non-time critical situations and may be applied instead of or in combination with voice communications.
AMC service provides controller with the capability to uplink an instruction to aircraft in order to check that they are not blocking a voice channel.
Additional requirements have been provided to deal with FANS accomodation.
The 4-Flight System shall be able to support (from airport based system which are not part of this document) Data link ATS Departure Clearance (DCL) and Data Link ATIS (D-ATIS), based on ACARS communication protocols.

COM-AGDL-001	The 4-Flight system, shall comply with all the requirements set out in the IR DLS and the associated Community Specification, as well as in the documents to which this text makes reference.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: The appliable documents are at least : ED110B, ED111, ED120 or the latest version.			

COM-AGDL-026	The 4 Flight system shall allow an eligible supervisor to off-line activate a systematic rejection of logon requests from a subset of flights that meet SFPL data criteria (aircraft operator ID, 24bits address…).		
	Applicability: Step1	Category: F	Commonality: ER

COM-AGDL-002	The 4-Flight system shall accept a LOGON only from aircraft: - Authorized to benefit from the data link service (e.g. that satisfy off-line configurable rules), - Whose data link application versions are compatible with those supported by 4-Flight, and - which correspond to an existing and available SFPL - not associated with another LOGON.		
	Applicability: Step1	Category: F	Commonality: ER

COM-AGDL-003	The 4-Flight system shall allow an eligible supervisor to activate / desactivate the systematic rejection of incoming LOGON requests.		
	Applicability: Step1	Category: F	Commonality: ER
Note: This command shall not affect the flights that are already logged.			

COM-AGDL-004	The 4-Flight system shall support the following inter-centre transfers: - From a data link equipped centre to a data link equipped centre - From a data link equipped centre to a non-equipped centre - From a non-equipped centre to a data link equipped centre.		
	Applicability: Step1	Category: F	Commonality: ER
Note: "A D/L non-equipped centre is a centre not able to provide communications via datalink"			

COM-AGDL-005	In case of logon forward failure using ground-ground communications or when this is

	(temporarly) not available, the 4-Flight System system shall perform a Context Management contact to allow connection between the aircraft and downstream ATSU.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The CM-Contact request can be sent automatically or manually by eligble controller.			

COM-AGDL-006	The 4-Flight system shall allow off-line definition of the triggering conditions related to D/L connection (e.g. CPDLC connection opening, NDA forward, CM CONTACT forward ..) according to a set of rules taking into account the following criteria at least : - SFPL data (D/L equipement, SFPL states,…) - Logon status.		
	Applicability: Step1	Category: F	Commonality: ER

COM-AGDL-018	The 4-Flight system shall allow off-line definition of the CPDLC function status (Enabled / Disabled) attached to each sector.		
	Applicability: Step1	Category: F	Commonality: ER

COM-AGDL-007	The 4-Flight system shall support intra-centre transfer between two sectors at least one of them being CPDLC enabled.		
	Applicability: Step1	Category: F	Commonality: ER

COM-AGDL-008	Only sectors having Sector CPDLC function status set to “Enabled” shall be able to communicate with authorized aircraft via D/L.		
	Applicability: Step1	Category: F	Commonality: ER

COM-AGDL-009	The 4-Flight system shall establish a CPDLC connection for each aircraft entering the airspace it manages and keep it alive as long as the aircraft stays in this airspace or is transfered to the next ATSU.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Airspace managed for CPDLC = bigger than the ATSU AoR (for example extended to 15 minutes of flight around it), so that the CPDLC connection is ready when the aircraft enters the airspace of the ACC.			

COM-AGDL-010	The 4-Flight system shall terminate an aircraft CPDLC connection automatically when one of the following conditions is satisfied : - the aircraft is transferred to the downstream ATSU - the SFPL is terminated for the ATSU.		
	Applicability: Step1	Category: F	Commonality: ER

COM-AGDL-012	The reception of a pilot request shall not prevent the controller, before answering, from finishing his current action and / or submitting different orders.		
	Applicability: Step1	Category: NF	Commonality: ER

COM-AGDL-014	The 4-Flight system shall allow off-line definition of a list of optional messages to be supported by the system.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Optional messages are limited to those described in ED 120.			

COM-AGDL-015	The 4-Flight System shall assure that only one logical position (LP) is CPDLC-responsible for a given flight. This will be the LP in charge of sending a CPDLC response to the pilot. Each downlinked messages (DM) shall be displayed on all OE (also on the MIRROR OE).		
	Applicability: Step1	Category: F	Commonality: ER

COM-AGDL-017	The 4-Flight system shall allow an eligible controller to uplink an instruction to all the CPDLC equipped aircraft that are assumed on the logical position in order to instruct them to check that they are not blocking a voice channel.		
	Applicability: Step1	Category: F	Commonality: ER

COM-AGDL-022	FANS accommodation shall be proposed as an optional mode, according to ANSP needs, in the frame of a common system concept.		
	Applicability: Step1	Category: NF	Commonality: ER

COM-AGDL-023	The 4-Flight system shall comply with ED100-A for FANS aircraft (aircraft fitted with data link equipment certified against requirements of ED100-A) in order to provide equivalent services as to the IR ones.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: In STEP 2, new FANS standard should be taken into account.			

COM-AGDL-027	The 4-flight system shall close a pending CPDLC dialogue when the task is concluded in R/T mode.		
	Applicability: Step1	Category: F	Commonality: ER

COM-AGDL-028	When grouping or degrouping sectors with CPDLC enabled, the 4-Flight system shall keep open the ground initiated dialogues while the Air initiated dialogues shall be closed.		
	Applicability: Step1	Category: F	Commonality: ER
Note: In case of opened ground initiated dilagues, the CPDLC function status shall be set to "enabled" also when the absorbing sector CPDLC function status is "disabled".			

NRDI-COM-AGDL-008	The 4-Flight System shall be able to accept LOGON requests but shall notify that the D/L service is not available (e.g. 'CDPLC not in use'), when Sector CPDLC function status of the sector in charge is set to “Disabled”.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-001	The 4-Flight System shall allow only one open dialogue of the same type with the same aircraft.for the exchange of CPDLC messages.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-002	The 4-Flight System shall only allow the exchange of CPDLC messages within a selected list compliant with ED-110B.		
	Applicability: Step1	Category: NF	Commonality: ER

NRDI-COM-AGDL-009	The 4-Flight System, through AGDL system, shall be able to operate in two modes for each sector: "ON" and "OFF".		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-010	The 4-Flight System shall be able, for the support of inter-ATSU transfer of control, to implement interoperability aspects of ground-ground coordination using LOF and NAN messags in support of the ACM service (ref. OLDI Specification - EUROCONTROL Specification For On-Line Data Interchange).		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-011	The 4-Flight System shall be able to automatically send the LOF message when the following conditions are verified: - the flight is logged - the flight category is outbound or overfly - the downstream ATSU is able to manage LOF message.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-012	The 4-Flight System shall be able to automatically send, before the Coordination Point (i.e. according to a paramter time/distance), the NDA message.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-013	The 4-Flight System shall allow the eligible contoller to send manually a NDA message to the aircraft.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-014	The 4-Flight System shall be able to, in case of no response to a CM-Contact request or negative result of logon with the ATSU suggested in the "Contact" request, forward to the aircraft the same CM-Contact request just once.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-015	The 4-Flight System shall be able to prevent the TOC/TOF order in DL modality when there is/are open ground initiated dialogue/s.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-017	The 4-Flight System, when issuing a data link transfer instruction between ATSU, shall send the VCI message (Contact) and a CPDLC-End Request.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-018	The 4-Flight System shall be able to execute the TOC/TOF order after the “Wilco” response from the aircraft. If the response Unable, Timeout or Error is received from the aircraft, the TOC/TOF order is aborted and a notify is sent to the controller responsible of the flight.		
	Applicability: Step1	Category: F	Commonality: ER
Note: A CPDLC end-response is associated to the Wilco.			

NRDI-COM-AGDL-019	The 4-Flight System shall be able to assume the control of a transferring flight only after the AOC command execution (in the Receveing ATSU) INTRA ATSU.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-020	The 4-Flight System, when issuing a data link transfer instruction between Sectors, shall send the VCI message (Contact).		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-021	The 4-Flight System shall be able to execute the TOC/TOF order after the “Wilco” response from the aircraft. If the response Unable, Timeout or Error is received from the aircraft, the TOC/TOF order is aborted and a notify is sent to the controller responsible of the flight.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-022	The 4-Flight System, in the Receveing Sector, shall be able to assume the control of a transferring flight only after the AOC command execution.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-023	The 4-Flight System shall be able to handle the downlink Monitoring (MRT) message.

	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-024	The 4-Flight System, after the calculation of the CPDLC flight status shall update consistently the CPDLC flight list in the Transferring and Receiving Sectors.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-028	The 4-Flight System shall make avalaible historic view of the D/L messages exchanged with flights according to configurable time parameter.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-029	The 4-Flight System shall get the following information from CM-Logon request message for a DL equipped flight: - Flight Identification - 24-bit ICAO address - Aircraft CM application address - Aircraft CPDLC application qualifier, version, address - Departur Airport - Destination Airport - EOBT (optional) - ATSU Facility Designation (optional).		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-030	The 4-Flight System shall get the following information from OLDI LOF message for a DL equipped flight: - Flight Identification - 24-bit ICAO address - Aircraft CM application address - Aircraft CPDLC application qualifier, version, address - Departur Airport - Destination Airport - Logon type.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-003	The 4-Flight System shall allow selecting the aircraft authorized to benefit from the data link service, according to the following optional criteria: - Airline, - Aircraft type, - Flight ID, - Aircraft Registration, and - 24 bit address.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-004	The 4-Flight System shall allow modifying each criterion used to select the aircraft authorized to benefit from the data link service . For example it shall be possible to add a new airline in the authorized list as soon as the ANSP considers that this airline fulfils all necessary conditions.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-005	The 4-Flight System shall manage the air ground communication state for each connected aircraft, and shall guarantee the global coherence of the CPDLC exchanges with each aircraft.		

	Applicability: Step1	Category: F	Commonality: ER

NRDI-COM-AGDL-006	The 4-Flight system shall support the format and safety/performances requirements described in Eurocae ED120 for DLIC and CPDLC.		
	Applicability: Step1	Category: NF	Commonality: ER

4.8.3 GROUND GROUND COMMUNICATION ASSISTANCE

COM-GRND-001	The 4-Flight system shall be compliant with the latest edition of the OLDI standard.		
	Applicability: Step1	Category: NF	Commonality: ER

COM-GRND-002	The 4-Flight system shall be compliant with the latest IOP standard.		
	Applicability: Step2	Category: NF	Commonality: ER
Note: IOP standards will result from ICOG 1 & 2 and SESAR studies.			

COM-GRND-003	The 4 Flight system shall implement LOF and NAN OLDI message to support the D/L coordination between ATSUs.		
	Applicability: Step1	Category: NF	Commonality: ER

COM-GRND-004	The 4-Flight system shall be compliant with the AFTN standards.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: AMHS protocol is planned to be implemented in Coflight V2 for the AFTN subscribers connection.			

4.9 DEPARTURES AND ARRIVALS SEQUENCE HANDLING

4.9.1 TRANSVERSAL

QMAN-TRAN-001	The 4-Flight system sequencing tools shall cooperate.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Even if DMAN is outside the 4-Flight step 1, it shall exchange or share data with the AMAN. In step 2, AMAN, DMAN, EMAN and SMAN should be included in the 4-Flight system and should cooperate.			

4.9.2 MANAGE DEPARTURE TRAFFIC

See TECH-DMAN-001 open issue as regards the DMAN integration into the 4-Flight system.

4.9.3 MANAGE ARRIVAL TRAFFIC

The Arrival Manager determines an optimum sequence of flights designated to arrive at selected runways, airports or designated fixes (merge points), according to configurable goals (e.g. minimum delay, minimum deviation from preferred profile, minimum taxiing, etc) and rates (seconds, aircraft per hour, nautical miles).

In order to organise and to meet the proposed arrival sequence, AMAN may also provide intermediate sequences for predefined designated fixes/COPs and advisories such as time to loose/gain, difference between the Estimated Time Over (ETO) points as calculated by the trajectory (SFPL estimates) and the Requested Time Over (RTO) of the flight into the arrival sequence (AMAN estimates). These advisories may be generated for defined designated fixes/COP's to be overflown and also top of descent, holding etc…The system shall support the multiple points sequencing and the Point Merge System technique.

The arrival traffic is organised far in advance of it approaching the target runway or airport and an important aspect of this functionality is the distribution of the advisories to all related operational sectors. In this way, constraints can be shared over a wide area, thus reducing the controllers workload in the approach phase and minimising the likelihood that severe constraints (e.g. holding) need to be applied.
AMAN relies on the definition of time/spatial based areas, named AMAN “Operational Horizons". These horizons are:

- "Eligibility Horizon": a time/spatial area in which the flights are considered for AMAN functions.
- "Active Horizon": a time/spatial area in which AMAN advisories can be provided and the eligible controller can perform all the possible commands on the arrival sequence.
- "Frozen Horizon": a time/spatial area in which AMAN advisories are not provided and the eligible controller can perform a subset of the possibile commands on the arrival sequence only in particular conditions.
- "Common Path Horizon": a time/spatial area in which AMAN advisories are not provided and the eligible controller cannot perform any command on the arrival sequence (the sequence is locked in any condition).

QMAN-AMAN-001	The 4-Flight system shall be able to provide and maintain arrival sequences for configurable multi-points (IAF, runway, merging points, designated fix) and for more than one airport in the same area.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-003	The 4-Flight system shall cope with both situations: - merging point sequence splitting into runway (or IAF or designated fix)sequences - merging point sequences merging into a runway (or IAF or designated fix) sequence.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-004	The 4-Flight system shall provide sequencing for a given flow of aircraft on a chain of points.		
	Applicability: Step2	Category: F	Commonality: ER

QMAN-AMAN-005	The 4-Flight system shall compute an optimized arrival sequence according to: - the selected strategy - separation rules - the aerodrome group configuration - wind condition - the selected sequencing rates (IAF sequencing rate / landing rate).		
	Applicability: Step2	Category: F	Commonality: ER
Note: Rates could be expressed in terms of at least: seconds, aircraft per hour, nautical miles.			

QMAN-AMAN-002	The 4-Flight system shall allow off-line definition of default sequence optimisation strategies.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-008	The 4-Flight system shall allow an eligibile operator to select online the sequence strategy among the default ones.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The eligible operator can be either an arrival sequence planning controller or an approach supervisor.			

QMAN-AMAN-006	The 4-Flight system shall allow off-line definition of separation rules according to the following criteria at least : - aircraft separation standards

	- wake turbulence categories - specific runway separation - noise restrictions - Letter of Agreement (LOA)		
	Applicability: Step1	Category: F	Commonality: ER
Note: 1) Specific runway separation can be applied in case of dependencies between runways especially in a parallel approaches context. 2) Visibility condition criteria could be an additional item.			

QMAN-AMAN-009	The 4-Flight system shall allow an eligible operator to modify AMAN landing rates and point or designated fix sequencing rates online.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The eligible operator shall be the Sequence Manager.Rates could be expressed in terms of at least: seconds, aircraft per hour, nautical miles.			

QMAN-AMAN-012	The 4-Flight system shall consider all arriving traffic as soon as flight data are available to verify its eligibility horizon according to eligibility rules.		
	Applicability: Step1	Category: NF	Commonality: ER

QMAN-AMAN-015	The 4-Flight system shall consider the following horizons: - Eligibility horizon in which the flights are considered for AMAN functions in accordance with AMAN eligibility rules - Active horizon where advisories can be provided - Frozen horizon where, under normal conditions, the sequence is frozen - Common path horizon where the sequence is locked (in any condition).		
	Applicability: Step1	Category: F	Commonality: ER
Note: In the frozen horizon, exceptions are made for manual insertion, manual sequence position, missed approach, cancellation and late appearing flights.			

QMAN-AMAN-024	The 4-Flight system shall allow off-line definition of the different horizons.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-011	The 4-Flight system, upon detection of a Late Appearing Flight, shall allow to insert manually or automatically the flight into the sequence.		
	Applicability: Step1	Category: F	Commonality: ER
Note: An example of late appearing flight is a flight approaching an airport close to the AoR limit.			

QMAN-AMAN-035	The 4-Flight system shall keep AMAN data up-to-date (sequence, QFU allocation, delay, advisories) in the Active horizon. In the Frozen horizon, only delay shall be kept automatically up-to-date.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-021	The 4-Flight system shall allow an eligible controller to manually manage the runway or point or designated fix sequences. Manual sequence management includes : - changing planned runway for a flight - moving a flight in the sequence - moving several flights in the sequence at once - swapping flights - inserting a flight - removing of a flight from sequence - changing planned IAF - delay a flight (without changing the sequence order) - priority setting - changing AMAN flight status of a flight or a set of flights. - Freeze and unfreeze Flight - insert and remove flight by Drag and Drop.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-022	The 4-Flight system shall allow to re-insert manually or automatically a missed approach flight into an arrival sequence.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-023	The 4-Flight system shall take into account priority of aircraft in arrival sequence updates.		
	Applicability: Step1	Category: F	Commonality: ER
Note: As an example, a higher priority shall be applied to a flight in emergency.			

QMAN-AMAN-028	The 4-Flight system shall provide QFU proposal for each flight in an arrival sequence.		
	Applicability: Step2	Category: F	Commonality: ER

QMAN-AMAN-017	The 4-Flight system shall allow users to choose a predefined QFU allocation strategy, based on the following criteria at least: - approach fix - departure airport - parking stand - airline preference - wake turbulence separation - noise restrictions - taxi configuration - aircraft performance - runway length - airport operation preference.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-014	The 4-Flight system shall allow eligible controller to insert runway configuration, runway unavailability and the strategy in operation according to a time slot or attached to a specific flight (from that flight onward).		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-013	The 4-Flight system shall generate an advisory on the departure time for aircraft not airborne yet and that needs to be delayed.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-018	The 4-Flight system shall provide RTO (IAF or a designated fix), Time to lose/gain, EAT, Type of aircraft.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-026	The 4-Flight system shall distribute the total delay for the flight (time to lose / gain) and the relevant apportioned delay to the En-route responsabilities and Approach ones.		
	Applicability: Step1	Category: F	Commonality: ER
Note: En-route delay can be shared between 2 or 3 ACC.			

QMAN-AMAN-027	The 4-Flight system shall provide the eligible controller with up-to-date delay for any flight in each sequence.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-031	The 4-Flight system shall allow off-line definition of a maximum arrival delay to be processed on each given leg and/or volume in an arrival sequence.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Different values shall be defined for the Approach and En-route contexts respectively, With volume we could mean specific sectors or other ATSUs. Maximum delay could be referred to IAF, threshold, designated fix.			

QMAN-AMAN-032	The 4-Flight system shall allow an eligible controller to manually manage the EAT. This includes : - to acknowledge EAT proposed by the system (e.g. to tag the EAT when it has been transmitted to the pilot - Cleared EAT) - to modify manually EAT - to cancel EAT - to identify EAT that have been given to pilots - to support EAT coordination between eligible controllers/positions.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-034	When updating a sequence, the 4-Flight system shall notify the eligible controller whether an EAT has changed of more than an off-line configuration time.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The 4-Flight system shall allow the eligible controller to monitor the EAT drift.			

QMAN-AMAN-016	The 4-Flight system shall provide arrival management advisories to eligible controller within the active horizon and among the following ones at least : - in terms of speed adjustment indications - holding - TOD - no action.		
	Applicability: Step1	Category: F	Commonality: ER
Note: This indication could possibly be given in absolute or relative speed.			

QMAN-AMAN-033	The 4-Flight system shall allow an eligible controller to clearly identify the flights for which the time to gain / to lose is higher than the maximum delay.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-019	The 4-Flight system shall allow eligible controllers to simulate AMAN what-if orders on a duplicate sequence.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-020	The 4-Flight system shall allow eligible controllers to replace the operational sequence with the AMAN what-if sequence when ready or to discard it.		
	Applicability: Step1	Category: F	Commonality: ER

QMAN-AMAN-025	The 4-Flight system shall calculate the current arrival rate drift for each runway.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-QMAN-AMAN-001	The 4-Flight System shall provide a enable/disable function to de-activate the AMAN tool when required.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-QMAN-AMAN-002	The 4-Flight System shall take into account the following priority order: - Emergency - No delay - Callsign - No priority.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Referred to QMAN-AMAN-023			

NRDI-QMAN-AMAN-003	The 4-Flight System shall maintain the scheduling of the flight on the IAF upon reception of a direct routing to a point past the IAF.		

	Applicability: Step1	Category: F	Commonality: ER

NRDI-QMAN-AMAN-004	The 4-Flight System shall enable the creation of a what if sequence, duplicated from the original one, up to a maximum number of what if sequences.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-QMAN-AMAN-005	The 4-Flight System trajectory updates (e.g. deviation detection, beacon overflown, etc.) shall be applied to the original and what-if arrival sequence.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-QMAN-AMAN-006	The 4-Flight system shall accept a configurable set of environmental data, defined as polygon, distance or time for the Eligibility Horizon, Active Horizon, Frozen Horizon and the Common Path Horizon.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-QMAN-AMAN-007	The 4-Flight system shall accept the definition of fixes such as Initial Approach Fixes (IAF), Final Approach Fixes (FAF), COP's for which speed and time advisories are to be generated, Runway threshold, and reference points for which RTO's are required.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-QMAN-AMAN-008	The 4-Flight system shall allow an eligible operator to select on-line the Operational Horizons configuration for a given airport among the default ones.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-QMAN-AMAN-009	The 4-Flight system shall consider of interest for AMAN function, all flights complying with the following Rules: Active Flights available from FDP System which are directed to airport interested in the AMAN sequence. Or: All pending flights departing from an airport within the AMAN Eligibility Horizon and directed to airport interested in the AMAN sequence.		
	Applicability: Step1	Category: F	Commonality: ER
Note: For active flight see Coflight definition.			

NRDI-QMAN-AMAN-010	The 4-Flight System shall distribute AMAN data (arrival sequences and advisories) to all sectors/ATSU, within AMAN Eligibility Horizon, involved in the predicted trajectory of the flight.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-QMAN-AMAN-011	The 4-Flight system shall allow an eligible controller to manually manage the CAP (correction advisory parameter). This parameter will affect the calculation of advisories. It will increase or decrease the compute delay according to input data. It will be expressed in term of time or percentage .		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-QMAN-AMAN-012	The 4-Flight system shall allow an eligible operator to freeze and unfreeze a subset of flights in an arrival sequence.		
	Applicability: Step1	Category: F	Commonality: ER
Note: The subset of flight shall be frozen and unfrozen with one single order.			

NRDI-QMAN-AMAN-015	The 4-Flight system shall consider as eligible all flights of interest within the AMAN Eligibility Horizon.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-QMAN-AMAN-016	The 4-Flight system shall compute an optimized arrival sequence according to: - the selected strategy - separation rules - the selected sequencing rates (designated fix sequencing rate / landing rate) - the aerodrome group configuration.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Rates could be expressed in terms of at least: seconds, aircraft per hour, nautical miles.			

4.10 SUPERVISION

The Supervision encompasses the technical and operational local/remote monitoring, control and check of the entire 4-Flight system.
It provides all services needed to monitor and control the overall system status, collect and store the diagnostics and instant indicators delivered by the managed objects and support the decision to be taken at operational level to allocate the resources (i.e. equipment and personnel) needed to manage the traffic demand.
It displays supervision information and exchanges data with managed objects , it includes an HMI, accepts supervision commands/actions from eligible operators and gives the capability to perform maintenance activities. It may use a database to manage and analyze useful data.
The Supervision is logically organised in the following layer:

- the local/manufactures layer which includes the managed objects to be supervised, which are either located in the operational centres (i.e. En-route, Approach, Airport) or remote sites (i.e. Radar Sites, Approaches, Towers, ..). The supervision of local managed objects can be performed either at local layer using specific HMI, or at higher layers (4-Flight Supervision) using standardised data and harmonised HMI.
- the 4-Flight Supervision layer is a key concept in the supervision architecture; it allows the supervision of a set of "local managed objects" associated to a single supervision centre.
- the supervision monitoring layer which aggregates and synthesizes two or more underlying layers.

4.10.1 TRANSVERSAL

The requirements included in this section are related to the configuration, organisation and management of Supervision System, user profiles and rights, HMIs, alarms and messages, managed objects, database.

SUPV-TRAN-001	The 4-Flight system shall provide the whole set of services needed by the technical as well the operational Supervision staff to : - monitor and control the overall technical and operational 4-Flight system status (i.e. set of managed objects); - collect and store the diagnostics delivered by the managed objects (i.e. nodes, applications, equipments, etc); - support the decision to be taken at operational level to allocate the resources (i.e. equipment and personnel) needed to manage the traffic; - monitor all the online services.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-011	The 4-Flight system shall provide all the services required to manage the Operational and Technical status without stopping or limiting system operability.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPV-TRAN-012	The 4-Flight supervision system shall be considered itself as an operational system and,

	consequently, it shall be supervised.		
	Applicability: Step1	Category: F	Commonality: ER/G
Note: Status of the 4-Flight system (including 4-Flight Supervision status) should be exchanged with external supervision using a standard protocol.			

SUPV-TRAN-002	The failure of 4-Flight supervision system shall not affect the normal operation of the monitored 4-Flight system.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPV-TRAN-003	The 4-Flight system shall provide a Supervision HMI to display all the information exchanged with managed objects.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-019	The 4-Flight system, via Supervision HMI, shall display the following data to be managed by the technical/operational Supervisor: - Alarms - Relevant Events - Commands/Actions - Technical and Operational data - Instant indicators - Status of managed objects.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-031	The 4-Flight system shall display the managed objects main attributes to the Supervisor : system mission (Civil, Military, Civil/Military), system state (training, test, operational, playback, evaluation) and/or use context (main, backup, fallback, on maintenance, not used, ..) and status.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-004	The 4-Flight system shall allow eligible Supervisor to issue commands/actions towards managed objects.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-038	All the 4-Flight supervision HMI positions shall be able to display all supervision data. Though, very easily (simple click on HMI), the supervisor shall have the possibility to modify his supervision position layout.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPV-TRAN-010	In order to harmonize the systems supervision, the 4-Flight system, via Supervision HMIs, shall apply the same HMI rules (colours meaning, windows behaviour, objects behaviour and so on…).		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPV-TRAN-015	The 4-Flight system, via Supervision HMI, shall have a graphical windows based environment.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPV-TRAN-017	The 4-Flight system, via Supervision HMI, shall provide a personalized “Login” process for each Supervisor in order to be able to memorize and recall automatically the personal configurations of each Supervisor.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-018	The 4-Flight system shall enable the Supervisor to be warned when the HMI is frozen.		
	Applicability: Step1	Category: F	Commonality: ER/G

Note: This warning may be an external advisory.

SUPV-TRAN-014	The 4-Flight supervision system shall be customisable in order to associate a severity to each raised alarm.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPV-TRAN-020	The 4-Flight system, via Supervision HMI, shall allow to provide sound alarms and blinking of message and associated managed object in correspondence to fault.		
	Applicability: Step1	Category: F	Commonality: ER/G
Note: For France, the 4-Flight Technical Supervision will interface an external automation component which will provide aural and visual alarms. Those alarms are related to failure detection in subsystems and heartbeat of the 4-Flight supervision system.			

SUPV-TRAN-021	The 4-Flight system, via Supervision HMI, shall stop the sound alarm and the message and managed object blinking upon reception of acknowledgement from the eligible supervisor.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-022	The 4-Flight system, via Supervision HMI, shall enable an eligible supervisor to acknowledge either one alarm or a selection or all the alarms.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-028	The 4-Flight system, via Supervision HMI, shall enable the eligible supervisor to identify easily the non acknowledged alarms from the acknowledged ones in the alarms list		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPV-TRAN-034	The 4-Flight system, via Supervision HMI, shall clearly distinguish the difference between lack of information on a system and malfunction. Thus, normal status meaning shall be guaranteed: it means that function is correctly running (and not that its activity is unknown).		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPV-TRAN-035	The 4-Flight system, via Supervision HMI, shall allow a graphical, synthetic and layered 4-Flight System status presentation. It shall be easily customised (i.e. XML files) in order to allow to adapt the layout (i.e. number of managed objects and their dependency tree) and the graphical behaviour (i.e. icons representing managed objects, colours, filters, views, etc) to each supervised object. The 4-Flight System shall be easily updated to allow to insert a new object in the presentation layout as well as to remove a new object from the same layout.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPV-TRAN-053	Tha 4-Flight system, via Supervision HMI, shall provide the capability to display the status of managed objects through synoptic representation.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-036	The 4-Flight system shall allow an eligible Supervisor, by synoptics off-line design tools, to create or edit any synoptic of the supervision HMI.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-025	The 4-flight supervision system shall generate a warning if a managed object changes its status very frequently due to instability.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-026	The 4-Flight system shall allow an eligible supervisor to mask a managed object.		
	Applicability: Step1	Category: F	Commonality: ER/G

Note: A masked object is an object which is created in the supervision configuration but not activated.

SUPV-TRAN-032	The 4-Flight supervision system shall provide the indicators through the 4-Flight supervision service.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-033	The 4-Flight System should handle alarms avalanche.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-039	The 4-Flight System shall allow the management of the following classes of Supervision users: - Administrator - Supervisor The Administrator shall be allowed to access both system and administration functionalities, to define the users profile (i.e. roles and rights) and account.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-040	The 4-Flight system shall allow eligible Administrator to configure two different Supervisor profiles and their different access rights: - Operational Supervisor: responsible for the 4-Flight System operational management (i.e. operational room configuration and reconfiguration, ..) - Technical Supervisor: responsible for the 4-Flight System technical management (i.e. system services continuity, maintenance, …).		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-041	The 4-Flight system shall enable to assign different level of rights to a Supervisor, as monitor (i.e. views) and control, in order to allow the continuity of the operational configuration and maintenance services provision.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TRAN-042	The 4-Flight supervision system implementation shall be done with hugely distributed software, using the current PC technologies (such as OS Windows or Linux), personal computer architectures, current extension cards and drivers, communication standards (USB, IP, etc.). In order to restrict the development and support costs, as far as possible, the more common technologies shall be used.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPV-TRAN-043	The 4-Flight system shall use normalized protocols and data formats between supervisions. When possible, proprietary formats shall be avoided. Spread data format such as SNMP or JBUS should be promoted.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPV-TRAN-049	The recovery time of 4-Flight supervision and supervision HMI shall not exceed to an agreed time (e.g. five minutes maximum).		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPV-TRAN-050	The 4-Flight supervision shall display the detected failure of any component within an agreed time (e.g. 1 second).		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPV-TRAN-051	The 4-Flight system supervision shall be designed according to modularity and flexibility principles in order to facilitate the set of managed object configuration (e.g. add, modify, remove managed objects).

	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-SUPV-TRAN-001	The 4-Flight System shall enable the eligible Supervisor to activate/deactivate alarm sound.		
	Applicability: Step1	Category: F	Commonality: ER/G

4.10.2 TECHNICAL SUPERVISION

The technical supervision service aims at monitoring and controlling in real time the status of all managed objects and needs to allow eligible Technical Supervisor to perform commands/action.
The Technical Supervision shows the objects status, provides failure detection and analysis tools and manages the diagnostic message in order to perform system fast recovery and re-establish full 4-Flight System capabilities.

SUPV-TECH-001	The 4-Flight system shall provide the set of services aimed to present the technical status of the overall 4-Flight System to the Technical Supervisor and to enable the eligible one to manage the ATM System operational availability in real time.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-002	The 4-Flight system, via Technical supervison (TECHSUP), shall provide the following services: - Monitor and Control: dealing with user oriented display of ATM system status and relevant level of performances; detection of the controlled systems and equipment faults, commands to support the system maintenance; monitoring of the system instant indicators - Diagnostic message management: dealing with the gathering and display of the diagnostic messages transmitted by the managed objects, according to user profile; - Technical supervision message and event storage : dealing with the storage of supervision message and events ; - Data analysis support related to historical data and technical supervision events: enable to filter, to sort data to generate customisable reports.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-003	The 4-Flight system shall provide the services needed to allow eligible Technical Supervisor to manage all the information dealing with the status and configuration of 4-Flight System. The information shall be either automatically provided by the TECHSUP or as response to specific Technical Supervisor requests.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-006	The 4-Flight System shall gather messages transmitted by managed objects and display them on suitable Supervision HMI. Messages shall be formatted in order to be easily identified and selected according to their severity (i.e. status, warnings, alarms, actions) and the following main attributes: - time - message source; - message content; - message severity level. - mission/state - context use.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-004	The 4-Flight system shall provide the services needed to allow eligible Technical Supervisor to perform commands/actions in order to recover 4-Flight System services in case of fault. The supported commands/actions shall allow to perform: - (Re)start/stop/stand-by/reset/switch-over of: system, system states, application, node, logical/physical communication;		

	- Diagnostics management to handle the flow and display of the diagnostic messages issued by the managed objects; - Create and perform customisable reports.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-005	The 4-Flight system shall ensure that all the commands performed by the eligible Technical Supervisor are properly executed. In case of failure detected during the command execution, the TECHSUP shall notify the eligible Technical Supervisor about unexpected results providing all the details needed to understand the reasons, which caused the detected command failure. TECHSUP command execution service shall fulfil the following general requirements: - Eligibility: the TECHSUP shall ensure that a command can be performed only by eligible technical supervisor; - concurrent command/order : a warning shall arise in order to inform about ongoing command execution. - Acknowledge: TECHSUP shall ensure that each command shall be acknowledged to eligible technical supervisor to notify that it has been received by destination managed objects; - Execution: TECHSUP shall ensure that each command performed by the eligible technical supervisor is executed; - Notification: TECHSUP shall notify the eligible technical supervisor with the result of each executed command regardless of the results.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-007	The 4-Flight system shall monitor its performance level and capacities, and raise an alarm in case the level goes under critical configurable threshold. The alarm allows eligible Supervisor to restore the proper safety, capacity and efficiency level when these are under specific threshold value.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-008	The 4-Flight system shall store a database all the information related to managed objects (i.e. system status, status changing, performed actions, alarms, status notification, configuration change, messages…).		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-010	The 4-Flight system shall allow to browse the stored information, to create customizable reports (i.e. historical, analytical, trend) and, on demand, to filter and/or to sort the required information.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-011	The 4-Flight system, to enforce the standardisation of data and protocol, shall be organised in the following Supervision layers: - The local or manufactures layer : this is the sub-system level. The data which are necessary for supervision are managed by equipment manufacturer. The data format should be as standard as possible at this level but, due to the system characteristics, it potentially can have several different and specific formats. At this level, the data format can't always be imposed. - The 4-Flight Supervision layer : this is the supervision level. At this level, all data shall be fully compatible with the supervision system. The data format shall be fully standard (e.g. SNMP). At this level, specific formats, owned by supervision software's provider, are not allowed. A way for easily transforming the data from Local/Manufactures to 4-Flight Supervision layer format shall be delivered by the manufactures (e.g. data bridges or proxy).		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPV-TECH-012	The 4-Flight system shall include an additional Monitoring Supervision layer to aggregate and synthesize two or more Supervision layers.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-013	The 4-Flight system shall be able to deal with synthesis objects, composed by several different managed objects coming from several different sources, providing a global functional status view. This 4-Flight system shall be compliant to the following requirements : - The 4-Flight supervision HMI shall be as ergonomic as possible. A non-hierarchical presentation of the objects shall be possible. Thus, clicking on a synthesis object shall provide an access to a new display. - All managed objects shall provide relevant supervision data to the centralised 4-Flight Supervision layer. - Objects status shall be compliant to the colour object rules.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-014	The 4-Flight system, via Supervision HMI, shall allow the Supervisor to modify the HMI in order to customise the set of managed objects.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-015	The 4-Flight system in case an event occurs, shall display the relevant message in a suitable list. The message text shall take the colour corresponding to the object status, according to the defined colour meaning.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-016	The 4-Flight system, via Supervision HMI, shall display the alarms list on demand.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-017	The 4-Flight system, via Supervision HMI, shall allow eligible supervisor to deactivate/reactivate the alarms for one or a selected list of objects.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-018	The 4-Flight system shall be able to delay before raising alarms for a customisable time interval.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-TECH-019	The 4-Flight system, off-line, shall allow to customise the use of colours associated with the status of managed objects, according to the different severity levels.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPV-TECH-001	In accordance to standard ISO 10164 the 4-Flight System shall order by increasing the different severity level (e.g. an event with a Minor severity level is more serious than an event with a Warning severity).		
	Applicability: Step1	Category: F	Commonality: ER/G
Note: Missing of status information related to managed object shall be highlighted through suitable means.			

NRDI-SUPV-TECH-003	The 4-Flight System shall allow the eligible Technical Supervisor to print: • Statistic reports, • Real-time data (e.g. resources usage), • Windows and screen. • each received event according to the following criteria: • by site;

	• by node; • by application; • by category; • by specified string.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPV-TECH-004	The 4-Flight System shall allow the eligible Technical Supervisor to on-line switch the states of all sub-system.		
	Applicability: Step1	Category: F	Commonality: ER/G

4.10.3 OPERATIONAL SUPERVISION

Operational supervision shows systems status and efficiency level to an operational supervisor, dealing with operational room activities and supported by a technical supervisor collaboration.
An operational supervisor can adopt the best operational configuration or re-configuration based on traffic needs and respond to potential components faults/failures, re-allocating available resources.

SUPV-OPE-001	The 4-Flight system, via Operational Supervision (OPSUP), shall provide the set of services needed to support the management of the 4-Flight System operational status and to facilitate decision-making related to control room management.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-OPE-002	The 4-Flight system, via OPSUP, shall provide the following services: - Monitor and Control: display the current 4-Flight System operational status and the level of performances - Operational configuration : enable the definition and application of a set of operational configuration according to different daily or seasonal traffic volumes - support in-advance operational configuration change - Operational supervision message and event storage and consultation : store all the supervision message and events and enable to consult them online.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-OPE-004	The 4-Flight system, via OPSUP, shall allow the eligible Operational Supervisor to monitor the 4-Flight System operational status by displaying the current operational status information, level of operational performances, and any detected operational supervision warning.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-OPE-005	The 4-Flight system, via OPSUP, shall display synthetic operational status information to facilitate operation supervisor decision-making to define the appropriate operational configuration required to cope with the traffic demand. The information shall be either automatically provided by the 4-Flight System or as a response to specific operational supervisor requests.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-OPE-008	The 4-Flight system shall display operational supervision warnings to the eligible Operational supervisor (e.g. : transgression of horizontal and vertical minimal distance, SSR Code saturation,…).		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-OPE-009	The 4-Flight system shall allow the eligible Operational Supervisor to manage at least the following operational configuration: - current operational room configuration (allocation of OE onto Logical Position) - current aerodrome group data (e.g. aerodrome group configuration, aerodrome QNH,		

	runway availability and rate, transition level, IAP in operation) - current distribution rules - current set of distributed maps - current TSA and CDR status - current airspace configuration (e.g. holding area, airspace changes script) - current SSR allotment plan - current frequencies allocation plan.		
	Applicability: Step1	Category: F	Commonality: ER

SUPV-OPE-010	The 4-Flight system shall provide the eligibile Operation Supervisor with support for preparing a operational room configuration modification.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-OPE-011	The 4-Flight system shall provide the eligibile Operation Supervisor with support for preparing an aerodrome group configuration modification.		
	Applicability: Step1	Category: F	Commonality: ER/G
Note: In case of a prepared modification, The next aerodrome group configuration shall become effective at different configurable times for AMAN, SMAN, DMAN, as regards FDP.			

SUPV-OPE-012	The 4-Flight system shall allow eligible operational Supervisor to broadcast text messages to inform controllers of significant operational conditions.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-OPE-013	The 4-Flight system shall display to the Operational Supervisor environmental data including at least: - ATM/CNS system status and configuration (En-Route, Ground) - Meteo forecast - Air-space restrictions - Flow Management Data.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPV-OPE-014	The 4-Flight Decision Support shall integrate the above information and compute the optimal configuration in order to ensure the management of foreseen traffic (e.g. min 01.00 hour, max 04.00 hours).		
	Applicability: Step2	Category: F	Commonality: ER/G

NRDI-SUPV-OPE-001	The 4-Flight System shall allow the eligible Operational Supervisor to enable/disable the AMAN tool.		
	Applicability: Step1	Category: F	Commonality: ER
Note: This capability is referred to NRDI-QMAN-AMAN-001			

NRDI-SUPV-OPE-002	The 4-Flight System shall allow the eligible Operational Supervisor to enable/disable CMA tool.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-SUPV-OPE-004	The 4-Flight System shall allow the eligible Operational Supervisor to manually modify the local and global QNH.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-SUPV-OPE-005	The 4-Flight System shall allow the eligible Operational Supervisor to enable/disable automatic reception of Global/Local QNH.		
	Applicability: Step1	Category: F	Commonality: ER

4.11 ENVIRONMENT DATA MANAGEMENT

This service is aimed at describing (creation, identification, modification, deletion) and managing all environment data needed by the ATM applications. The service can be split in four sub-services:

- Transerval.
- Off-line environment data preparation which is aimed to the off-line environment data acquisition and modification. The acquisition can be performed importing the foreign and custom environment data by other equivalent systems as well as locally through specialised HMI. It also provides the means to perform the merging between the several environment data sources as well as the data storage and export.
- On line environment data preparation aimed to perform the equivalent off-line service over a bounded set of data.
- Env data distribution to external client.

4.11.1 TRANSVERSAL

ENV-TRAN-001	The 4-Flight system shall include a environment data preparation and distribution service.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-TRAN-002	The 4-Flight system shall allow for a national and local data preparation service while ensuring consistency between these two levels.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-TRAN-003	The management of pre-defined data within 4-Flight system shall be processed off-line without interfering on data used in operational service.		
	Applicability: Step1	Category: NF	Commonality: ER

ENV-TRAN-005	The 4-Flight earth model shall comply with the international standard WGS84.		
	Applicability: Step1	Category: NF	Commonality: ER

ENV-TRAN-006	The 4-Flight system shall provide consistency, semantic check and mechanism to identify modified items for automatic and manual data creation and updates at every exploitation level.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-TRAN-007	The 4-Flight system shall notify operators of erroneous data automatically collected from external sources. During the consistency checking process, the 4-Flight system shall enable the manual validation and correction of those erroneous data.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-ENV-TRAN-002	The 4-Flight system shall provide eligibility check for the consultation of the Environment data.		
	Applicability: Step1	Category: F	Commonality: ER

4.11.2 MANAGE OFF-LINE ENV DATA

This service characterises the definition and the management (creation, identification, modification, and deletion) of off-line environment data needed for the on-line 4-Flight functions.
The non-exhaustive list given below is an inventory of data, which need to be pre-defined:

- airspace data structures required for route processing and determination of sectors sequences. These airspace data structures include specific airspace volume definition (sectors, military areas, TMA, ...), route network, identification and geographic localisation

of navigation aids...;
- rules and strategic constraints associated with volumes of airspace, sectors, routes, airports and other airspace elements required for route processing and trajectory calculation (CDR, TSA, SID, STAR, …);
- specific sets of data required for SSR code assignment: lists of SSR Mode A codes according to pre-defined classification (ORCAM rules), description of Mode S area, ...;
- pre-defined operational procedures required for co-ordination: standard co-ordination conditions (LoA between units, local ATC procedures), ...;
- specific sets of data required for trajectory calculation: aircraft performances, airline exploitation rules ...;
- pre-defined data structures required for supervision and configuration : operational entities description, default mapping of OE or sectors to CWP, pre-defined sectors/CWP configurations, pre-defined sectors/radio frequencies configurations, pre-defined sets of data according to operating modes (full, test state), ...;
- the "off-line data acquisition and modification of environment data" function uses:
    - the environment data selection, i.e. the process to extract from input data files or data bases, the appropriate data needed for the on-line 4-FLIGHT functions. This includes the searching for the required environment data for 4-Flight functions and the format conversion if necessary.
    - The environment data capture, i.e. the process to input data manually into the data preparation processing system. This is done via a dedicated data preparation HMI.
    - The eligibility, i.e. the process to check the data preparation operators access rights in order to authorise or not their manual modifications.

ENV-OFF-001	Within data preparation service, the 4-Flight system shall be able to provide all the airspace, aeronautical and aircraft data required to support all the operational services provided in Step1.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-002	The 4-Flight system shall be able to issue static information updates following the ICAO Airac cycle.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-003	The 4-Flight system shall notify the data preparation operators when errors or rejected actions are detected during the data capture, the data selection, the data merging and the data modification. The off-line environment data preparation function shall provide context information associated with each error to enable the operator to identify and correct the error.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-005	The 4-Flight system shall allow to abort the processing of the off-line environment data preparation function without compromising the integrity of the proposed new data set or the target reference database.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-006	For off-line environment data acquisition and modification, the 4-Flight system shall allow the selection and capture environment data from diverse input data files (e.g. EAD AIXM). These selection and capture are achieved according to pre-defined criteria.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-007	For off-line environment data acquisition and modification, the 4-Flight system shall allow the selection and capture environment data from the 4-Flight instances operating at the higher exploitation levels.

	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-008	For off-line environment data acquisition and modification, the 4-Flight system shall allow the manual selection and capture of pre-defined environment data via a suitable HMI on behalf of the off-line data preparation operators.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-009	The 4-Flight system shall individually tag off-line environment data with the exploitation level at which they were created : - current exploitation level if the data is manually created at this level - origin exploitation level if the data is captured from a higher level.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-010	The 4-Flight system shall include eligibility mechanisms for the off-line environment data acquisition and modification. Eligibility shall be defined according to the operator authentication and the environment data and its origin (level of exploitation at which it was created).		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-011	The 4-Flight system shall provide mechanisms for the precise identification of modified items at each delivery of the off-line data environment from an exploitation level to the other exploitation levels and the final users.		
	Applicability: Step1	Category: F	Commonality: ER
Note: Those mechanisms may rely on : - off-line environment data preparation operators responsible for checking the pre-defined data capture or modification - operators responsible for using the pre-defined data (e.g. off-line environment data preparation operators of other exploitation levels, operators responsible of the initialisation of the 4-FLIGHT components - This includes indication of the date and time of production, the version identification and the validity period of the new set of data resulting from the successive data preparation steps			

ENV-OFF-012	For off-line environment data preparation, the 4-Flight system shall allow the merging of all the data selected from the diverse input sources (Same exploitation level sources : other 4-FLIGHT instances, other ATC systems; higher exploitation level sources : national or European ATC systems; manual inputs) to form the set of data needed at this exploitation level.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-013	In off-line environment data preparation the 4-Flight system be able to define and validate a data set as a whole, piecemeal or incrementally during its creation at the discretion of a user.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-014	In off-line environment data preparation, the 4-Flight system shall provide consistency mechanisms for all the pre-defined data produced at the same exploitation level and between the data defined at different exploitation levels.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-015	The 4-Flight system shall include an efficient and as much as possible automated data distribution in order to avoid complex 4-Flight components updates.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-016	The 4-Flight system shall include storage mechanisms for prepared data in order to prevent loss of data.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-017	In data preparation, the 4-Flight system shall allow the compilation and the management of several different sets of pre-defined data.		
	Applicability: Step1	Category: F	Commonality: ER

Note: A set of coherent environment data resulting from the off-line environment data preparation function constitutes an ENV data version.

ENV-OFF-018	The 4-Flight system shall provide mechanisms for the precise identification and description of modified items at each internal delivery of the reference sets of pre-defined data.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-019	The 4-Flight system shall provide mechanisms for the precise identification and description of modified items at each delivery of the reference sets of pre-defined data to the other external ATC systems.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-OFF-020	The 4-Flight system shall allow to prepare the configuration parameters necessary for all logical components and distribute these parameters to interested parties.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-ENV-OFF-001	In data preparation, the 4-Flight System shall make available pre-defined sets of data to different 4-Flight System functions, applications or other external ATC systems.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-ENV-OFF-002	The 4-Flight System shall request to the eligible operator a confirmation before the data set committing to the reference database		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-ENV-OFF-003	The 4-Flight shall be able to offline define Global and Local QNH.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-ENV-OFF-004	The 4-Flight system shall allow an eligible operator to print Environment Data, according to predefined filters (e.g. exploitation level).		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-ENV-OFF-005	The 4-Flight System shall allow the eligible operator to off-line assign at start-up a state for each sub-system.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-ENV-OFF-006	The 4-Flight system shall allow to off-line configure the AoI		
	Applicability: Step1	Category: F	Commonality: ER

4.11.3 MANAGE ON-LINE ENV DATA

The aim of this sub-service is to:

- perform on-line management (creation, identification, modification, deletion) of particular environment data either automatically thanks to provision of environment data from automated external sources and from other 4-Flight System functions or manually via inputs from eligible operators,
- ensure consistency of environment data inputs (manual and automatic).

The on-line environment data management function is composed of:

- Manual on-line environment data modification (this part should be addressed by the Operational supervision service),
- Automatic on-line environment data modification,

- Consistency checks on environment data inputs (manual and automatic),
- Storage of environment data ready for use to the other 4-FLIGHT functions,
- On-line distribution of environment data ready for use,
- Storage of environment data ready for use to external systems,
- On-line distribution of environment data ready for use to external systems.

Note : on-line Env data manual modification is addressed to Supervision service (see Operational supervision service).

ENV-ON-001	The 4-Flight system shall enable the manual on-line creation and modification of some environment data.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-ON-002	The 4-Flight system shall be able to receive and manage up-to-date meteorological information.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-ON-003	The 4-Flight system shall allow to define for each area a Global/Local QNH value to use for all the functions using Global/Local QNH (safety nets, altitude display…).		
	Applicability: Step1	Category: F	Commonality: ER

ENV-ON-004	The 4-Flight system shall support the WMO World Meteorological Organization - Specifications for GRIB message Reference : FM92-GRIB2-Edition 2 – Version 2 – February 2005.		
	Applicability: Step1	Category: NF	Commonality: ER

ENV-ON-005	The 4-Flight system shall be able to dynamically accept data capture (AIS data, weather data, TSA/CDR status, Aerodrome group configuration at least) from external clients.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-ON-006	The 4-Flight system shall include eligibility mechanisms for the manual on-line creation and modification of environment data. These mechanisms shall be defined according to the operator authentication and the environment data.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-ON-007	In on-line environment data modification, the 4-Flight system shall notify operators of errors or rejected actions.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-ON-008	The operational system parameters that are ‘on-line modifiable’ shall be determined. Precise list will be agreed and delivered at a later stage in the program.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-ON-009	The 4-Flight system shall be able to capture and update dynamically from external clients, the environment data which are available. These data shall include at least, meteorological data from meteorological systems and airspace availability data from military systems or CFMU/CADF, aerodrome group configuration from airport systems.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-ON-010	The 4-Flight system shall distribute environment data, which have been automatically modified on-line or manually created or modified on-line to external systems.

	Applicability: Step1	Category: F	Commonality: ER
Note: The distribution of modified env data to the internal components or functions is implicit			

ENV-ON-011	The 4-Flight system shall redistribute environment data at every system start-up and data modification including update.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-ON-012	The 4-Flight system shall provide consistency mechanisms for all the environment data collected from automated sources at the exploitation levels and between all these data and the environment data and the environment data previously defined.		
	Applicability: Step1	Category: F	Commonality: ER

ENV-ON-014	The 4-Flight system shall ensure consistency of Env data between all services.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-ENV-ON-001	The 4-Flight System shall provide mechnisms for the precise identification of modified items at each environment data modification by the automatic on-line environment data modification process.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-ENV-ON-002	The 4-Flight System shall be able to automatically get and update the Global QNH from external Meteo systems.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-ENV-ON-003	The 4-Flight System shall be able to automatically get and update the Local QNH from external Meteo systems.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-ENV-ON-004	The 4-Flight System shall allow eligible operator to manually modify manually the Global QHN.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-ENV-ON-005	The 4-Flight System shall allow eligible operator to manually modify the Local QNH also for each LP (approach control for several airport).		
	Applicability: Step1	Category: F	Commonality: ER

4.11.4 EXCHANGE ENVIRONMENT DATA WITH EXTERNAL CLIENTS

This sub-service is in charge of providing the reference for sets of pre-defined environment data to/from other external ATC systems.
This includes:

- the provision of locally input pre-defined environment data (i.e. all the input environment data at the site exploitation level),
- the provision of the whole set of environment data resulted in the merging of the environment data from the various input sources (i.e. all the environment data from the various exploitation levels constituting an ENV data version).

ENV-DIST-001	The 4-Flight system shall be able to provide airspace and aeronautical information in a standard format based on XML to external users.		
	Applicability: Step1	Category: NF	Commonality: ER
Note: AIXM for airspace data - XML for others data			

4.12 TRAINING AND SIMULATION

4.12.1 TRANSVERSAL

The 4-Flight system will provide support for simulation activities and training of personnel, providing features to address all steps of training activities: ab initio training, training on unusual situation, training on new environment and on the introduction of new functionalities.

SIMU-TRAN-001	The 4-Flight system shall provide controllers with training means for transition and ab initio training purposes.		
	Applicability: Step1	Category: F	Commonality: ER/G

SIMU-TRAN-002	The 4-Flight system shall support training state and enable on-site training session for the en-route and/or approach air traffic controllers of the related ATSU.		
	Applicability: Step1	Category: F	Commonality: ER

SIMU-TRAN-004	The 4-Flight System shall allow to start an exercice with flight plans already transferred or coordinated.		
	Applicability: Step1	Category: F	Commonality: ER/G
Note: This shall allow controllers to practice situation awareness at the beginning of a training session.			

SIMU-TRAN-005	The 4-Flight system shall include simulation capabilities (e.g. Air Traffic generator and PWP) when operated in training state.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SIMU-TRAN-007	The 4-Flight system shall able to use the same env data as in the operational mission and additional env data dedicated to training state.		
	Applicability: Step1	Category: NF	Commonality: ER/G
Note: In some cases it should useful not to insert all the operational env data in a training session (to assess a new env data set related to new airspace definition for instance)			

SIMU-TRAN-008	The 4-Flight system shall be able to run a training session based on either : - Live traffic (shadow mode operation), - Recorded live traffic, - Simulated traffic.		
	Applicability: Step1	Category: F	Commonality: ER/G

SIMU-TRAN-009	The 4-Flight system shall be able to simulate a complete environment, including intra and inter-centre co-ordinations.		
	Applicability: Step1	Category: F	Commonality: ER/G

SIMU-TRAN-010	The 4-Flight system shall be able to use simulated time instead of real (wall-clock) time in training sessions, and shall provide facilities to: - set the simulated time to any given value at the start of the training sessions, - freeze and unfreeze the simulated time. - speed-up or slow down the simulated time.		
	Applicability: Step1	Category: F	Commonality: ER/G
Note: address time speed management (fast forward or slow down)			

SIMU-TRAN-011	The 4-Flight system shall provide means to: - simulate aircraft navigation and piloting, - generate simulated traffic (tracks and datalink messages)

	Applicability: Step1	Category: F	Commonality: ER/G

4.12.2 MANAGE TRAINING AND SIMULATION

NRDI-SIMU-TRAN-001	The 4-Flight System training sessions shall be representative of the corresponding operational system functionalities.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SIMU-GEN-001	The 4-Flight System shall process realistic simulation of an ATC environment, where a predefined group of aircraft shall be automatically navigated by the System, as well as controlled by Pseudo-Pilots, according to the ATC rules and Controllers instructions.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SIMU-GEN-002	The 4-Flight System shall process , at least , these ATC simulation functions : -Simulated Radar Data Processing Functions (ATG - Air Traffic Generator) -Exercise Preparation Functions -Exercise Management Functions -Pseudo-Pilot Functions -Recording/Playback Function -Simulated Flight Data Processing Functions -Controller Working Position Functions -Simulated Safety Nets Functions		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SIMU-GEN-003	The 4-Flight System shall generate the Simulated Targets associated to the aircraft code according to the FPL, and simulate the aircraft detection according to the selected radar configuration.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SIMU-GEN-004	The 4-Flight System for each Simulated Target , shall calculate, periodically, the aircraft position with respect to all active Surveillance input (e.g. primary, secondary, SMR).		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SIMU-GEN-005	The 4-Flight System shall navigate the Simulated Target in two different ways: - Automatic Navigation Mode, by the System starting from the Flight Activation until the Flight Termination - Manual Navigation Mode, when the navigation order are input through the Pseudo-Pilots.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SIMU-GEN-006	The 4-Flight System shall activate each Simulated Target in Automatic or Manual Mode .		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SIMU-GEN-007	The 4-Flight System shall navigate the Simulated Target according to the Aircraft Performances.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SIMU-GEN-008	The 4-Flight System shall process each Simulated Target to perform at least the following manoeuvre according to the associated Flight Plan (Automatic Mode) or the Pseudo pilot's order (Manual Mode): -Fly a STAR (standard Arrival Route) -Fly a SID (standard instrument departure) -Enter fly and exit a predefined Holding Circuit and Orbit -Fly an ILS (Instrument Landing System) Approach

	-Fly a Missed Approach Procedure -Fly with specified heading -Fly according to the specified Climb , Cruise or Descent Profile -Fly to a predefined Airport or Fix -Fly a Visual Approach.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-SIMU-GEN-009	The 4-Flight System shall process Simulated Targets with the Route field as a sequence of Fix .		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-SIMU-GEN-010	The 4-Flight System shall be able to manage Simulated Scenario.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SIMU-GEN-011	The 4-Flight System shall be able to manage Simulated Exercises.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SIMU-GEN-012	The 4-Flight System shall be able to manage Simulation Session.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SIMU-GEN-013	The 4-Flight System shall be able to manage the Simulated FPL/RPL: -Inserting new FPL -Modifying FPL -Activating FPL.		
	Applicability: Step1	Category: F	Commonality: ER

NRDI-SIMU-GEN-014	The 4-Flight System shall be able to manage a Simulated FDP for the ATC Simulator purpose.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SIMU-GEN-015	The 4-Flight System shall be able to configure and manage pseudo-pilots position for the ATC Simulator purpose.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SIMU-GEN-016	The 4-Flight System shall be able to process pseudo pilots orders in two ways: -LABEL INPUT orders: achievable directly on the track label -MENU INPUT orders: achievable by a dedicated menu (PILOT orders menu).		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SIMU-GEN-017	The 4-Flight System shall made available in addition to the standard information available on CWP , the following information at the Controllers trainee positions for the ATC Simulator purpose: -Exercise Time -Exercise Execution Speed -Exercise Name		
	Applicability: Step1	Category: F	Commonality: ER/G

4.13 ATFCM

Out of scope for STEP1. To be confirmed for next steps.

4.14 ARCHIVING

Out of scope for STEP1. To be confirmed for next steps.

4.15 SYSTEM OPERATION AND MAINTENANCE SUPPORT

The Support function timeframe has a much larger scale than the operational one and it contains actions for the evolution of the system and pre and post flight activities.
Within ATM, one of the fundamental requirements for ATC is to provide a safe, reliable function. This makes it necessary to provide the ability to analyse the function offered by the ATC system and evaluate its quality. One way to meet this objective is to equip systems with three complementary capabilities:

- The capability to record all data of interest to ATC operation.
- The capability to Playback recorded situation.
- The capability to analyse, validate and display recorded data in a manner which is easy to interpret for users.
- The capability to configure, test, deploy the system on the platforms.

4.15.1 TRANSVERSAL

No commonalities identified throughout the Level 2 services of System Operation and maintenance support.

4.15.2 PROVIDE SUPPORT SERVICES FOR ATM SYSTEM DEPLOYMENT AND CONFIGURATION

Support to system deployment and configuration cover the following aspects:

- Hardware/Software support to production, update, certification, distribution, problem tracking and resolution, etc.
- Adaptation support to import adaptation data available from commercial providers, create, modify and delete entities in the database, qualify the database for on-line use, etc.
- Training (and test-ware) a means to first test the system in near-real environment and then to train the technical staff in using the system.
- System Monitoring and Control(SM&C) supports: software, data deployment and cut-over, system start-up, start-over, switch-over, capacity and performance data collection and monitoring, on-line adjustment of various parameters and functions, etc.

SUPP-CONF-013	The 4-Flight system shall manage objects classes corresponding to at least: hardware; system component; subsystems; software packages; version packages; infrastructure.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-014	The 4-Flight system shall be able to return the list of hardware and computer systems necessary to perform the applications needed to achieve a given Mission/State.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-015	The 4-Flight system shall manage infrastructure allocation changes to Missions.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-016	The 4-Flight system shall manage software updates of software packages for computer systems in 4-Flight.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-017	The 4-Flight system shall manage software packages in the form of version packages.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-018	The 4-Flight system shall allow to specify the version package to be used on a given infrastructure.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-019	The 4-Flight system in Operational state shall be able to feed simultaneously several 4-Flight systems in Evaluation state, in Test state or in Training state with on-line receive (read only) data.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-020	The 4-Flight system in test state shall be able to use live, simulated or synthetic data.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-029	The 4-Flight system in Evaluation state shall be able to use live data, simulated or synthetic data.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-021	It shall be possible to filter the information distribution between the 4-Flight system in Operational state and the 4-Flight system in Evaluation state, in Test state or in Training state. The filtering options will include selection based on the information origin.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-022	The 4-Flight system in Test, Playback, Training or Evaluation state shall not degrade the on-line operational ATM system.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-023	The 4-Flight system in Test state, Training state or Evaluation state shall include all the functions that are provided by the 4-Flight system in Operational state.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-024	The 4-Flight system in Test state shall enable inter-ATS units tests between several test systems and located at different ATS units.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-030	The 4-Flight system in Evaluation state shall enable inter-ATS units evaluation between several systems in Evaluation state and located at different ATS units.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-025	The 4-Flight system shall allow for a simple start-up procedure.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-026	The 4-Flight system shall provide automatic (if needed) and manual switch-over between main and fallback systems.		
	Applicability: Step1	Category: F	Commonality: ER/G
Note: The choice between the two methods shall be take into account safety, performance, system operativity.			

SUPP-CONF-027	The 4-Flight system switch-over mechanism between main and fallback shall minimize the operational impact.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPP-CONF-032	The 4-Flight system switch-over between main and backup shall be transparent for the

	controller.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPP-CONF-028	The 4-Flight system shall continuously update the fallback system with the data needed to ensure the continuity of operational services.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-031	The 4-Flight System shall support system deployment and configuration with continuity of service and with the capability to roll back.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-CONF-033	The 4-Flight system shall allow an eligible operator, after a synchronisation period, to swap evaluation and operational systems with minimum impact on controller operations.		
	Applicability: Step1	Category: F	Commonality: ER/G
Note: This allows a new version of the software or data to be put into operation with minimum impact to the system's clients. Such a switchover may not be totally seamless with respect to a client's processing.			

SUPP-CONF-034	When implementing a new version of an interface with an external system, the 4-Flight system shall support the previous version of the interface with this external system.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-CONF-001	The 4-Flight System shall provide on-line services needed to perform the manual ATM System re-configuration and undertake automatic re-configuration actions as a consequence of system status change, in order to ensure a continuous and right level of system performance. Services shall include: -Manual configuration management including: - system start-up, re-start, shut down, partial inhibition and rolling back to the previous or predefined configuration; - Automatic reconfiguration, in order to redistribute hardware and software resources in the following two cases: - Degradation or failure, in order to preserve the highest availability levels; - Change of needs/demand, in order to adapt available resources to new requirements.		
	Applicability: Step1	Category: NF	Commonality: ER/G

4.15.3 RECORD DATA

The Recording and Playback service must provide an interface with operators. From this interface, those responsible for managing and operating the recording and Playback shall be able to interact with the function: activate and deactivate recording, manage the recorded data, begin Playback or analysis sessions etc...

SUPP-REC-001	Data of interest for CWP Replay shall include all the data and information made available to any operator by the system. This shall include: - Data presented to the operator. - Data not actually presented to the operator but available to him/her (e.g. radar data outside the displayed radar zone, inactivated maps, minimized window).		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-REC-002	Technical data of interest for CWP Replay shall include: - the commands and data introduced by the operator into the system from the CWP (e.g. data introduced by keyboard, touch-screens, pointing devices or voice, even if they are rejected by the system), - The operational status of the position (sectorisation, ATC tool configuration status...) - the technical status of the position (errors, device failures...) - Data regarding the operational supervision of the system;		

	- Data about displays and actions taken at operational positions other than CWP's (e.g., SFSC actions or reconfigurations of ATC tools).		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-REC-003	Technical data of interest for System Data Analysis shall include as a minimum, data : - regarding the technical supervision of the system, as well as displays and a log of actions taken at the various technical positions (e.g., availability of components, manual and automatic reconfigurations of hardware and software resources, and records of subsystem events and errors), - obtained from external sources, which are used by the system to the service ATC (e.g., data obtained from radar sites, OLDI lines, AFTN lines, A/G data links), - calculated by the data processing system, which are not displayed at the CWP but considered necessary for a complete representation of the overall scenario of the ATC service (e.g., radar processing data, flight profiles, flight data used in route charges calculation, airway in use and data relevant for FUA).		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-REC-004	The 4-Flight system shall be able to continuously record, on stable media, all ATC system data defined as data of interest.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-REC-005	The 4-Flight system shall record all data with a suitable time reference, and with a granularity sufficient to allow synchronised replay.		
	Applicability: Step1	Category: F	Commonality: ER/G
Note: In case of simulated time, recording of both simulated and real times may be required.			

SUPP-REC-019	The 4-Flight system shall allow to determinate for any recorded data what was the associated system mission and state		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-REC-006	For CWP replay, the 4-Flight system shall record the data which has actually been displayed to the controller.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPP-REC-007	The 4-Flight system shall make available all recorded data for use by external systems.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-REC-008	The 4-Flight system shall be flexible enough to make it possible to configure additional data of interest to be recorded.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-REC-009	The 4-Flight system shall be capable of recording and replaying the full set of data defined as being of interest of a CWP.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-REC-010	The 4-Flight system shall provide an interactive replay mode allowing the controller to modify the presentation of recorded scenario (e.g. range and bearing, range scale,..).		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-REC-012	For CWP Replay, the 4-flight system shall be able to generate copies of displays, either on paper or on storage media on pre-defined formats.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-REC-016	The 4-Flight system shall provide the recorded flight data in a XML format.

	Applicability: Step1	Category: NF	Commonality: ER/G

SUPP-REC-017	The 4-Flight system shall provide the recorded surveillance data in a Asterix Cat 62 format.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPP-REC-018	The 4-Flight system shall provide the recorded safety nets data in a Asterix Cat 004 format.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPP-REC-020	The 4-Flight system shall comply with the Eurocae ED111 for D/L message recording.		
	Applicability: Step1	Category: NF	Commonality: ER/G

SUPP-REC-021	The 4-Flight system shall maintain recorded data for a period compliant with the applicable national regulation.		
	Applicability: Step1	Category: F	Commonality: ER/G
Note: The decree "Arrêté du 20 octobre 2004 relatif aux enregistrements des données relatives à la gestion du trafic aérien, à leur conservation et à leur restitution" is the currently applicable regulation in France.			

NRDI-SUPP-REC-001	The 4-Flight System shall allow the following recording configurations: a) selected from a series of pre-defined configurations. b) manually defined.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-REC-002	The 4-Flight System shall allow to initialise a CWP replay session specifying the desired CWP and the time period of interest.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-REC-003	The 4-Flight System shall allow the synchronised Replay of more than one CWP.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-REC-004	The 4-Flight System shall allow the initialisation of a CWP replay session from the CWP replay position.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-REC-005	The 4-Flight System shall provide an active replay mode, in which the user may select the data to be presented. [Both the recorded data actually presented to the operator at the time and the data available to the operator at the time, should be available for replay (e.g., zooms, actions on labels, visualisation of point co-ordinates, activation and deactivation of maps, azimuth/distance lines, flight data consultations, and consultation of meteorological and aeronautical information).]		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-REC-006	The 4-Flight System shall provide a set of commands for controlling the replay at the position where it takes place.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-REC-007	The 4-Flight System shall provide a command for selecting the precise moment in time from which replay is to begin or continue.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-REC-008	The 4-Flight System shall provide a "play" command for starting a replay from the selected moment in time.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-REC-009	The 4-Flight System shall provide a "pause" command for halting replay at a given moment while maintaining the visualisations active. In the active mode, this function shall also keep available all of the consultation and display functions specified for the mode.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-REC-010	The 4-Flight System shall allow pre-defined replay speed factors.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-REC-011	When the speed factor is not 1.0, the replay of voice data should be inhibited.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-REC-012	The 4-Flight System shall record the controller HMI video component as a screen recorder for the playback in passive mode.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-REC-013	The 4-Flight System shall record the controller audio components and the video component as independent sources for the playback in passive mode.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-REC-014	The 4-Flight System shall record the controller audio components and the data of interest as independent sources for the playback in active mode .		
	Applicability: Step1	Category: F	Commonality: ER/G

4.15.4 PROVIDE DATA ANALYSIS FUNCTION

When an environment is running a mission (or is being set-up to run it) a large number of data and events need to be captured for immediate and differed analysis:

- Technical users will need these to analyse the behaviour of the system for debug purpose and capacity management.
- Operational users will need these to monitor and analyse the operational behaviour of the system (e.g. requests for flight plan information).

This needs include the following non exhaustive list of analysis :

- Periodic Traffic Statistics
- Ad-hoc Statistics
- Custom Statistics
- Performance Indicators
- Statistics on Flight Plan Handling
- Statistics on Messages and Data Link connections
- SSR Code Assignment Statistics
- Operations Room Management Statistics
- Airspace Availability Statistics
- Controller Inputs Statistics
- Dedicated Statistics for Tower and Approach
- Dedicated statistics for the Central Route Charges Office (CRCO)
- Other Data analysis.

SUPP-DAF-001	For data analysis, the 4-Flight system shall provide the user with facilities and procedures (e.g. automatic pre-defined queries) for filtering and reducing recorded data of interest, so that they can be interpreted and used in a practical manner.

	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-DAF-002	For data analysis, the 4-Flight system shall provide the facility to store the results of user enquiries on standard media (e.g. DVD).		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-DAF-003	For data analysis, the 4-Flight system shall provide facilities to extract required data from core files to ease the track down of the cause of system aborts or any problems.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-DAF-004	For data analysis, the 4-Flight system shall be capable of presenting the following information: the contents of the core files; a map of basic monitor pointers; other information obtained from the core files, such as the reason for the abort, general registers, etc.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-DAF-005	For data analysis, the 4-Flight system shall allow generation of off-line statistics from recorded data.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-DAF-006	For data analysis, the 4-Flight system shall generate on-line statistics from actual and/or historical data, on request, on a time basis and/or on passing a threshold.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-DAF-001	For data analysis, the 4-Flight System shall accept, in a predefined format, queries to extract parts of or all the recorded data of interest.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-DAF-002	For data analysis, the 4-Flight System shall support the automatic execution, at a time or time interval as specified during the definition of the query, of persistent queries.		
	Applicability: Step1	Category: F	Commonality: ER/G

4.15.5 PLAYBACK SITUATIONS

The Playback service must provide interfaces with Playback users: HMIs for Playback purposes, display systems for the results of system data analysis, and communication links through which to distribute the data which must be provided to external users.

SUPP-PBK-001	The 4-Flight system shall clearly distinguish the visualisation in a CWP Replay position from operational CWPs.		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-PBK-002	For CWP Replay, the 4-Flight system shall provide at least a passive mode. This mode shall only allow the modification of replay control commands (e.g. start/stop, half speed, double speed, etc.)..		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-PBK-003	For CWP Replay, the 4-Flight system shall be capable of reproducing at all times, an agreed time of display of any CWP's which are or have been operational (e.g. 120 minutes).		
	Applicability: Step1	Category: F	Commonality: ER/G

SUPP-PBK-004	The 4-Flight system shall allow any CWP replay within less than an agreed time (e.g. 10 minutes).		
	Applicability: Step1	Category: NF	Commonality: ER/G

NRDI-SUPP-PBK-001	The 4-Flight System shall allow the eligible playback operator to select the active (interactive)/passive mode		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-PBK-002	The 4-Flight system shall be capable of reproduce the requested playback in active mode with the audio/video components automatically synchronized .		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-PBK-003	The 4-Flight system shall reproduce the requested playback in passive mode without processing the recorded data.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-PBK-004	The 4-Flight system shall be capable to reproduce the requested playback in passive mode in a multimedia standard format .		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-PBK-005	The 4-Flight system shall be capable to reproduce the playback in passive mode activating only the requested audio or video sources independently recorded.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-PBK-006	The 4-Flight system shall be capable to reproduce the playback in active mode activating only the requested audio or video sources independently recorded.		
	Applicability: Step1	Category: F	Commonality: ER/G

NRDI-SUPP-PBK-007	The 4-Flight system shall be capable of reproduce the requested playback in passive mode with the audio/video components automatically synchronized .		
	Applicability: Step1	Category: F	Commonality: ER/G

5 OPEN ISSUES

This section provides a list of operational and technical issues which need further investigation.

5.1 OPERATIONAL ISSUES

OPE-TRAN-001: Integration issues between 4-Flight system and the TWR legacy system need further investigation in the case of co-located approach control and aerodrome control. In such a context, the same controllers shall be able to use both systems.

OPE-TRAN-002: Degraded modes and especially the impact on the controller work need further investigation. The need to implement a fallback FDP and paper strip printing in the 4-Flight system shall be confirmed.

OPE-TRAN-003: The FAB implementation is an important objective to be achieved in 4-Flight systemS timeframe. As consequence 4-Flight system shall be flexible enough to support the FAB deployment. This will require further investigation.

OPE-TRAN-004: Military and civil co-location needs futher investigation.

OPE-FDP-001: Reclaim service will be implemented in Coflight V3 only and then it will be available for 4-Flight system Step2, while it is expected in Step1 (otherwise, it will introduce a regression in the Italian operations).

OPE-SNET-001: The APM needs further clarification as regards scope and functionalities.

OPE-CMA-001: The agenda and context filtering functions need further investigation before being applicable as such in an Approach context. In any cases, the 4-Flight system shall satisfy controller needs on conflict detection and management in both contexts, but not necessary in the same way. (note : The corresponding URs that have been provided in the URD are not currently tagged as En-route specifically. As a consequence, they could be applicable to the Approach context if no clarification is given).

OPE-CMA-002: The needs for the management of reminders of instruction planned but not yet issued to the pilot (e.g. in-advance tactical contraints/orders) should be assessed by the ATCOs (Trajectory edition requires this kind of capability for reminding instruction after complex redefinition of a trajectory).

OPE-CMA-003: The role and use of the CDTT should be better investigated.

OPE-CWP-001: The CWP HMI requirements have been kept at a high level in the URD. However, They require further investigation to capture the operational needs (eg. cooperation tools between planning and executive controller). To achieve this objective, the users shall be involved in an iterative definition process including prototypes and operational evaluation.

OPE-COM-001: The consistency between Assume/Shoot events and D/L dialogue management needs clarification. In addition, the definition of a transferred flight shall be clarified. A first operational investigation highlighted that different behaviours are expected in different contexts (e.g. transfer process would start when the ATCO sends the transferring message in the intra ATSU context while it would start when the ""Wilco"" message is received by ground systems in case of inter ATSU transfer.

OPE-COM-002: It is necessary to clarify when/how an AGDL controller instruction shall be processed by the 4-Flight system as regards the pilot Wilco/Unable/Stand-by reception. The impact on the system shall be analysed. To clarify how the tactical constraint application point is determined. A first operational investigation highlighted that in general the process should start as soon as the input is given by the ATCO but that further improvements could provide for different behaviours by different subsystems (FDPS, CDTT, etc.).

OPE-AMAN-001: The integration of the point merge system procedure into the generation of sequences, advisories and proposed runways needs further investigations. The integration shall ensure the provision of an acceptable accuracy of RTO estimation.

OPE-AMAN-002: The update of the sequence data according the aircraft position and predictable trajectory. The traffic in the terminal areas usually diverges from the standard arrival procedure leading to an unacceptable estimated arrival time. On the other end the ATCO can not be overloaded to update the trajectory according the instruction given to aircrew. That's why the system should provide the capability to be configured to predict the aircraft trajectory according the traffic behaviour under nominal condition and related sequencing strategy.

OPE-SUPV-001: The definitions of the Supervision HMI and Operational supervision warnings need further investigation.

OPE-SUPV-002: The aerodrome group configuration is needed for both En-Route/Approach and TWR controllers. The responsibility of management of aerodrome group configuration and the impacts on operations shall be clarified.

OPE-SIMU-001: The 4-Flight system shall meet the needs related to the On-the-Job Training. Further investigations are necessary to define the user requirements with the operational staff in a stripless environment.

OPE-SIMU-003:	Specific tools for the preparation and evaluation of complex sectorisation is deemed necessary and the inclusion of these tools in 4-Flight system scope shall be clarified.
OPE-SUPP-001:	The need of recovery systems to cope with disaster shall be clarified.
OPE-SUPP-002:	The need of quick replay tool shall be clarified as regards the 4-Flight system scope (radio communication playback is out the scope). It necessary to clarify whether quick playback of air surveillance situation requires specific tools and whether they shall be included in the 4-Flight system.
OPE-SUPP-003:	Switching-over from test state to operational state (Evalution state to operational state) shall be clarified as regards the impact on controller's work and the operation room configuration.
OPE-SUPP-004:	Needs related to system probes and network probes shall be clarified and described more explicitly.
NRDI-OPE-TRAN-001:	Integration issues between 4-Flight system and the AOIS legacy system need further investigation
NRDI-OPE-QMAN-001:	Shall be identified who is in charge to enable/disable function to de-activate the AMAN tool Referred to NRDI-QMAN-AMAN-001

5.2 TECHNICAL ISSUES

TECH-TRAN-001:	The transition plan is handled at the ANSP level.
TECH-ASUR-001:	The interface between the 4-Flight system and the TWR system to provide the air surveillance service shall be clarified. More particularly, the opportunity to implement some 4-Flight system air surveillance display remotely in a TWR context shall be confirmed.
TECH-ASUR-002:	The opportunity to keep or remove legacy local tracking components inside the TWR system (main airports only) shall be clarified taking into account surface tracks / air tracks merging and primary tracks processing.
TECH-ASUR-003:	The opportunity to activate the ARTAS cooperation function shall be clarified.
TECH-GSUR-001:	Surface surveillance data shall be provided to Approach controllers (Departure EC & PC) either through a remote display of the TWR system or through a more integrated solution as regards the 4-Flight system. The two options shall be assessed to adopt the most suited solution.
TECH-SNET-001:	The interface between the 4-Flight system and the TWR system to provide the safety net service shall be clarified in consistency with the air surveillance service (see TECH-ASUR-001).
TECH-FDP-001:	The interface between the 4-Flight system and the TWR system to provide the flight data processing service shall be clarified. More particularly, the opportunity to connect the 4-Flight system to remote strip printer or to implement some 4-Flight system flight plan display remotely shall be confirmed.
TECH-CMA-001:	The interface between the 4-Flight system and the TWR system to provide take-off/landing/missed approach detection data shall be clarified in consistency with the air surveillance service (see TECH-ASUR-001).
TECH-COM-001:	The opportunity to implement the DCL service in the air server (or in the 4-Flight system at least) shall be clarified.

TECH-COM-002:	D-ATIS service needs further investigation. Would the D-ATIS service be provided with Env data by the 4-Flight system (considered as a Env data server) or should it have direct link with external Env data servers (Meteo service provider, ..).
TECH-SUPV-001:	In case of non co-located Approach control and En-route control, the 4-Flight system shall enable to implement remote supervision. This issue needs further investigation especially for the WAN.
TECH-ENV-001:	The interface between the 4-Flight system and Meteo service provider attached to a given aerodrome shall be clarified. How aerodrome QNH data are input and managed in the 4-Flight system shall be clarified (especially for SNET).
TECH-ENV-002:	The interface and the relative scope between the 4-Flight system and the TWR system shall be clarified as regards Env data management (especially in case of co-located Approach control and TWR control). This issues shall address AIS data, distributed maps, ...
TECH-ATFCM-001:	The interface between the 4-Flight system and legacy ATFCM systems shall be clarified.
TECH-AMAN-001:	AMAN arrival sequences shall be provided to the TWRs, the sequences might be available remoting the AMAN display or distributing the sequence data. The two options shall be assessed to ensure the proper TWR system integration.
TECH-DMAN-001:	Departure sequences shall be provided to the En-Route/Approach by the TWR System, the sequences might be available remoting the DMAN display or distributing the sequence data. The two options shall be assessed to ensure the proper TWR system integration.
TECH-CAP-001:	The 4-Flight system shall derive all the system capacities already defined in Coflight and ARTAS. Other system capacities shall depend on the characteristics of the future national ATC system infrastructure which needs to be further investigated.
TECH-PERF-001:	The 4-Flight system shall derive all the system performance requirements already defined in CoFlight and ARTAS. Other system performance requirements shall depend on the characteristics of the future national ATC system infrastructure which needs to be further investigated.